

THE AMERICAN ARCHITECT

FOUNDED 1876

A SPANISH INTERLUDE

By WALTER H. KILHAM, F.A.I.A.

THOSE who prefer to contemplate architecture in a highly developed and standardized state would do better to spend their vacation in France, for Spanish architecture is nothing if not individualistic and every Spanish architect seems to have gone on the principle that his churches were made to be looked at and enjoyed rather than analyzed. The Spanish towns themselves are all different from each other and from anything else on earth. Whether hanging on the verge of deep gorges like Ronda, Toledo or Segovia, or standing among a waste of boulders of which, like Avila, it seems a part, or as at Burgos nestling in a peaceful, even if generally somewhat desiccated, valley, each town has a peculiar character of its own, and expresses it in buildings, customs, and speech. Especially marked are the differences in style of the local architecture, and the climate, which in France turns all the old buildings to a uniform gray, is here so dry that the original colors of the various stones employed are perpetuated for centuries. This diversity of style is the despair of learned doctors who argue about "influences" and declare that all the best Spanish work is by foreign masters and that Spain has no style of

its own. Elie Faure goes so far as to maintain that the Escorial is the only truly Spanish building the country ever produced. In the presence of such works as the Cathedrals of Segovia or Barcelona, or the brilliant carving of the Casa del Ayuntamiento at Seville, I fail to see how he can feel that way; at any rate, if Spain has not a national architectural style she has the architecture, or as a Frenchman would say, she may not have the gravy but she has the goose, which is the main point.

But even now, in spite of all Spain's recent popularity, I imagine more people have heard of Velasquez and Zuloaga than the Cathedrals of Burgos and Avila, and the Alhambra of Washington Irving is better known than the aqueduct of Segovia, while among architects there are too many who imagine that the mere copying of details will make their buildings "Spanish." Breadth, freedom, originality and contrast of blank wall spaces with brilliant ornament, and a liberal dose of swagger are the lessons architects can learn from Spain, if any, remembering also that the living parts of Spanish houses face inwards, and turning them inside out for American use is apt to result disastrously.



"THEY HAD TIME!"



GENERAL VIEW OF AVILA

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Still, with all the publicity which has recently come to Spain, the later arrivals, with their many photographs and plates, have not even begun to clean up the unpublished treasures of the country. The principal monuments of the more important cities have been photographed and in some cases measured, but scores and hundreds of churches and houses, Gothic, Romanesque and Classic, all worthy of study, are still blushing, unseen so to speak, in country villages and the outlying precincts of the cities, ready for the pencil and camera. Traveling, whether by train or motor, is perfectly comfortable for a reasonable person who is satisfied with good food and clean beds, and prefers the sight of the pinnacles of Burgos or Segovia to a private bathroom and overstuffed armchairs, but those who desire the latter comforts will probably be better suited at Poland Springs or Palm Beach, for they are not plentiful in Spain.

The perfect time to arrive in a Spanish town is by moonlight, and luckily the railroad schedules are entirely in accord with this arrangement, so that no planning is necessary, for that is what the traveler has to do anyway, and if, as was the case with us last Summer, the almanac favors you with a full moon, each successive mediaeval town will be introduced in its proper aspect.

Such places as Avila, Segovia or Toledo should never be approached by daylight, in the full glare of a Spanish sun which reveals every detail, leaving nothing to the imagination. Far better to stumble sleepily out of the train into the dimly lighted interior of the omnibus. The bags, are they all right? The Senor is assured that they are on top. A hectic search for the sketching bag, which has disappeared, finally reveals it concealed by the voluminous skirts of a pretty Castilian peasant girl. It is two o'clock in the morning. With sputtering protest the motor jerkily starts, rattles the bus between the white

walls of a mysterious suburb, swings around a curve and then, as at Toledo, for instance, the ghostly apparition of a mighty city with bridges, walls and towers bursts into view, each rampart outlined by silvery moonlight, and hanging in the air like Xanadu or the magic city of the Thief of Bagdad. The bus swings on to the bridge and heads for the narrow arch of the city gate—will it go through or stick? An exciting moment of darkness ensues when all bets are even, then up the steep grade, around a hairpin turn, through more dimly lighted narrow streets of fortress-like houses and we stop before a building which strongly resembles a jail, but which proves to be, once its mighty doors have swung back, a comfortable hotel which may possibly even contain a perfectly good bathroom and is practically sure to set a good table.

If you enter Spain from Irun you will pass through a delightful verdant mountainous country for fifty or sixty miles, not unlike Vermont on a larger scale until you reach the summit. After that point is reached the verdure quickly dries up and by the time Miranda de Ebro is reached you are well into the sunburnt and treeless plains which cover most of the central plateau of Spain. If you pass by Vitoria and happen to be traveling by rail, somewhat fed up with the barren prospect, there will come a moment when, as the train rounds a certain curve, the car window will disclose a thrilling mass of towers and pinnacles apparently created out of nothing, and surrounded by a huddle of low-lying tiled roofs and brown walls. This is Burgos, once the proud Capital of Castile, but now aside from its monuments only a second rate, dusty and bleak provincial town.

There are some dilapidated palaces and decaying old churches as well as some excellent cafes along the river, where one may be introduced to highballs of vermouth and "cock-tails" (sic) when



INSIDE OF OLD CITY GATE,
SEGOVIA



STREET FOUNTAIN,
BURGOS



CHURCH OF SAN NICOLAS,
SEGOVIA

foresore and satiated with architecture, but it will be hard to keep very long away from the cathedral. This church, graceful and elegant, is a veritable jewel casket, sparkling with fretwork, pinnacles and spires, made as Sedgwick says, to be looked at and not written about. Inside and out it teems with beautiful detail which frequently is of Renaissance character rather than Gothic, the Spanish way of producing a charming result without bothering very much about purity of style. The German architects who made the plan and brought along with them the twin openwork towers of the Fatherland were not long able to withstand the spell of Spain which wove into their design many a detail of which they probably had never dreamed the likeness. One speculates why the beautiful view of the church from the paved square to the south is not more often published instead of the conventional west elevation, which after all is not as good as in many other cathedrals of the same type.

There are two things not to be missed in Burgos; go around the church with the Sacristan just to enjoy the pure Castilian of his speech if for nothing else, and then climb the hill behind the cathedral to the ruined castle for the view down over the spiky pinnacles and spires to the far sweeping treeless uplands beyond the huddled city roofs. Then having done this, take a taxi, or walk to the Hospital del Rey, Las Huelgas and by all means the Cartuja de Miraflores, a couple of miles where will be found the most peaceful and completely restful cloister this side of Heaven and marvelous carving by Gil de Siloe, master craftsman of these parts.

While at Burgos, in some way I seemed to please the landlord of the Hotel Avila, for in parting, he singled me out for the honor of the *abrazo* and dragged me to his back office for a *copita*, so that

we departed in a blaze of glory. The pleasure of a trip in Spain is greatly enhanced by a little intercourse of a friendly nature with the population who are always hospitable and friendly, especially if they think you are "simpatico" and really wish to like them. In Spain or Mexico I have never found this to fail, even when handicapped by faulty knowledge of the language, but a critical or supercilious attitude is likely, there as elsewhere, to cause unpleasantness.

In distinction from Burgos, Avila, taken as a city, is a wonder of the world. Granite built and grim, placed four thousand feet above sea level on a waste of ledges and boulders, its lofty walls intact with their eighty-six towers, it stands like a ghostly vision of the Middle Ages, unchanged and seemingly impregnable. Lacking some one to write a popular poem, it is less famous than Carcassonne, but as a place to visit it possesses far greater interest. Its Cathedral, whose embattled apse forms part of the city wall, has none of the airy grace of Burgos, but instead is grim, powerful and eternal, and true to Spanish tradition, is different from anything else in the world.

Someone ought to publish a monograph on the houses of Avila. There they stand in desolate majesty along the cobbly streets of the half-deserted town, looking like a part of the very structure of the earth itself. Exaggerated voussoirs and Herculean lintels seem to indicate a distrust of arches among the fathers of the town and a deep-rooted preference for a pre-Roman or rather Cyclopean school of architecture which in a way is more modern than anything in the Paris Exposition last Summer. Although Avila is not as well known as Burgos, it really contains much more of architectural interest.



SEGOVIA
"A CHURCH TO GIVE AWAY"



PLASTER WORK, SEGOVIA
NOTE STUCCO PATTERN ON WALLS



BURGOS
DOORWAY OF AN OLD HOUSE

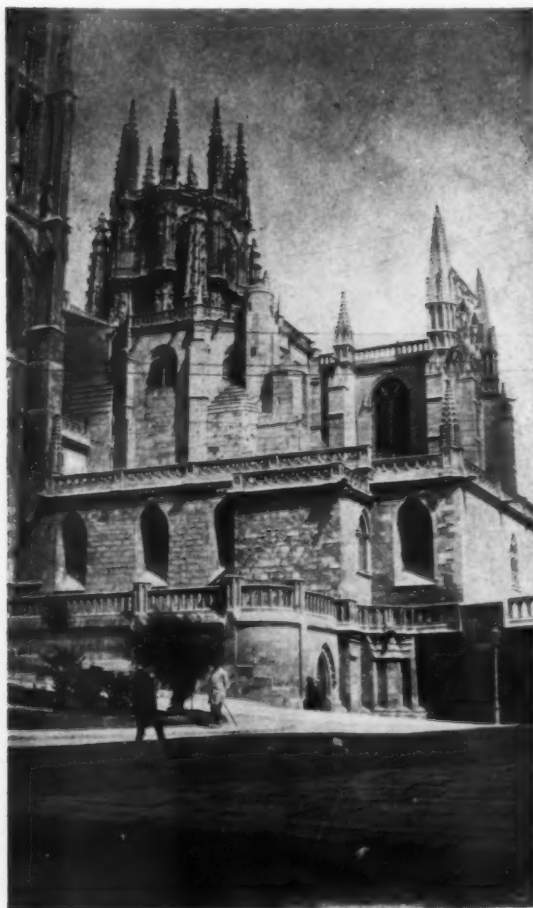
In Avila we chartered an automobile at the hotel to take us to Segovia. The distance is about fifty miles and we thought that if we started, say, at half past four we could easily arrive in time for the late Spanish dinner, and so we sailed merrily down the hill, over breezy uplands, and through stone built villages, every one of which would make the fortune of any American photographer.

Suddenly our car, which was of an extremely popular American make, stopped with an ominous and only too familiar motion. A blow-out. Nothing at all, but the rim bolts were rusted on and only a cold chisel to cut them off would help. From the empty horizon's rim the populace began to gather. The village schoolmaster came, who understood neither English nor Fords, but invited me to his house for a *copita*. (This made two *copitas* in two days.)

Cars came along one by one until five husky chauffeurs were struggling with that infernal rim. Time went by and I thought it well to say a word of apology to the owners of the waiting cars. In each case the response was the same: "Es nada,

Senor, we have plenty of time. We never dine before nine o'clock." They had *time*, these Castilians! Something which I thought had disappeared from the earth and was all gone! And they wanted to talk, about America, and did I like Espana, wasn't it beautiful, and how long did it take me to get there? I made a hit by saying that our delays were all due to the American car. Nobody would allow me to pay his chauffeur for his exertions. Finally the wheel was fixed and we started. The big Castilian moon came up and flooded the landscape with silvery light. Great rocks and gnarled trees came by. Three times did our tires give out, and each time did one of these Spanish angel families stand by, until at last, about ten o'clock, in a lonely defile, the engine died. "*Es el colmo!*" gritted the driver. Again our friends appeared, made room for me in their tiny Mathuis and took me to Segovia in search of a relief car.

Never shall I forget swinging around a bend and facing the mighty aqueduct, its arches glistening in the moonlight as they strode across the silent city above the leaning houses in the square. with ghostly



THE CATHEDRAL, BURGOS



THE CATHEDRAL FROM ACROSS THE CLAMORES, SEGOVIA

buildings and towers rising in terraces on the steep hill above. "Through this arch once tramped the Roman legions," muttered my guide. There was time to say that, even under the circumstances.

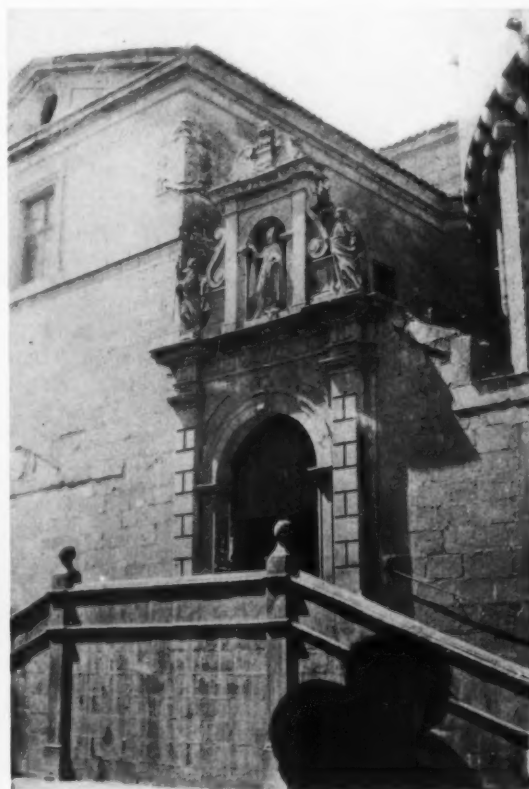
We woke up a taxi driver and started out to find our stalled car. The new man had never been outside the city walls, much less at night, the "road to Avila" meant nothing to him, and it was up to me to find it. In five minutes we had lost our way. By moonlight all that country looks about alike, and a hectic search resulted, the end of a perfect day. In time the castaways were located and the good Hotel Comercio Europeo completed the program with an excellent dinner of one hundred per cent pre-Volstead type, served at eleven P.M., just as if it was the regular thing.

Segovia lies along a lofty triangular promontory above the deeply grooved gorges of two small streams. The sides of the promontory are covered with brilliantly green trees and shrubs contrasting with the sweep of the red and brown table lands beyond. At the western point of the triangle crowning a blood-curdling cliff, is the great Alcazar, a true fairy tale castle and a worthy abode for ogres and magicians, separated from the city by a tremendous moat eighty feet deep. The battlements of this apparition are carried forward on the cliffs so as to resemble the prow of a ship. Higher up

and farther back on the ridge is the Cathedral, whose mass and tower dominate the entire panorama. The rest of the hill is covered with the crowded and tortuous streets and lanes of the city, sloping gradually to the low ground at the east which is spanned by a great Roman aqueduct 2,700 feet long, one of the wonders of Spain, whose 320 arches, some of them 100 feet high, stride across the busy square far above the house tops. Its roughly hewn unmortared blocks still show the holes made for the lewises when they were hoisted into position for the Roman Governor. The narrow and rather steep Calle de Cervantes leads up the hill from the aqueduct to the Plaza Mayor and the Cathedral. Half way along it swings out from the dark shadows of the ancient buildings to the edge of the old city wall overlooking the valley and the distant mountains. A little cafe has space along the parapet for three or four tables, and here you can spend an evening looking over the velvety blackness of the gorge below to the distant peaks of the craggy Guadarramas. Around are buildings more closely resembling theatrical scenery than anything else; in fact just as we remarked that it was time for the chorus to come on there appeared from a dark corner a troop of men in gowns with pikes and lanterns, perhaps the night watch, or maybe a sort of



TOWER OF ARIAS DAVILA, SEGOVIA



DOORWAY AT REAR OF CATHEDRAL, AVILA

Spanish Ku Klux, anyway the picture was complete and another Benedictino was obligatory.

This street is for its length one of the most interesting in Europe. As it leaves the straggling Plaza del Azoquejo under the lofty aqueduct it passes under ancient overhanging timbered buildings, and working up the hill, past the cafe on the wall it borders the well known Casa de los Picos, now a club, the stones of whose facade are cut in the form of facets, the fine Romanesque arcades of San Martin, brilliant in the strong southern sun, and great fortress-like towers of ancient grandees.

On the left, a row of graceful traceried windows carved in slate mark the facade of the Alpuente palace while just below are Moorish remains, great stone steps leading down the hill, and a remarkable mosque, still intact. At the top the street swings into the Plaza Mayor where the apse of the Cathedral bursts into view, a lively and swaggering mass of pinnacles, turrets and galleries in bright yellow stone, filling the whole end of the square as would a blare of music.

Segovia Cathedral is the work of Juan Gil de Hontanón, who was at the same time building the "new" Cathedral of Salamanca, and of his son. It is of the type which the Spanish call a "Cathedral-Salon," rather a good name I should say. The nave arches are very lofty, about seventy-five feet or so to the soffit of the crown, and the triforium is omitted, so that the clerestory begins just above the nave arcade. The great width of the aisles and the size of the bays give a spacious feeling similar to that of Salamanca, and there is a delicious color scheme of yellowish pink stone, relieved by the splendid black grilles of the side chapels and the white, rose and slate-covered tiles of the floor. The church was begun in good Spanish Gothic in 1525 (the fact that the rest of the world was doing Renaissance did not matter) but the dome did not come along until about 1620 and so necessarily conformed to the then prevalent "tipo herreriano" of the Escorial, but, however, is not at all ungrateful in spite of it. Much of interest can be found in the book on Segovia written by the excellent local historian, Sr. Don Eugenio Colorado y Laca, who relates the struggles of the Segovianos to replace the earlier Cathedral, destroyed during the struggles of the "Comunidades" in 1520. Resources were scanty, and many sacrifices had to be made. The chapter wished to build of rubble instead of stone but the builders resisted, "valiantly," says our historian. They took up collections and undoubtedly staged a "drive." The ladies pawned their jewels, and in two weeks the trenches were opened and the first stone placed by the good bishop D. Diego de Ribera on the 8th of June, 1525. The exterior with its tall and straight tower forms an exceedingly effective mass especially seen from across the gorge of the Clamores but the west front is possibly a little severe. The sheer and lofty walls of its tower shoot straight into the air, almost unrelieved, to a



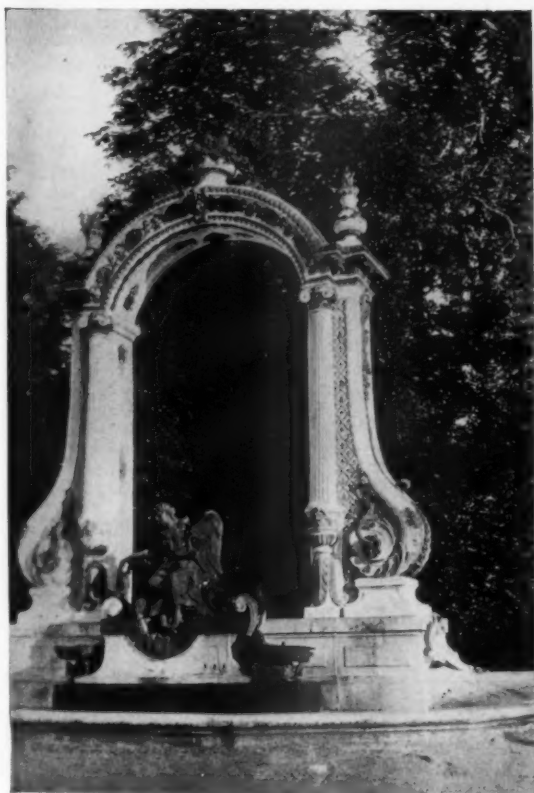
S. JUAN DE LOS CABALLEROS, SEGOVIA

(Now used as a pottery by the "Hijos de Daniel Zuloaga")

dizzy height. Just below the belfry is a tiny iron balcony, with a flying fleck of white sheet and honest red flannel underwear, evidently the abode of the bell ringer and his family, but a good color note for the picture. Don Eugenio realizes that owing to lack of resources this facade is less elaborate than that which was executed by the same architect for Salamanca, but philosophically remarks that "we ought actually to bless the penury which caused it, because thanks to it the facade was built majestic and elegant without the disfigurement of useless details."

Segovia has more Romanesque churches than one can see in several days, churches in fact to give away, I was informed, to any one who would agree to restore them. The family of the artist Don Daniel Zuloaga, now deceased, occupy one of the most beautiful of these churches, S. Juan de los Caballeros, and in the furnaces installed under its vaults they manufacture the charming decorated pottery and faience so characteristic of the art of old Spain.

The arabesque stucco facades of many houses, a relic of Moorish occupation, still imitated, though not so well, is another item of interest in the old town's catalog of treasures. Much of it is modern, but here and there an old patio reveals some of the



FOUNTAIN, LA GRANJA

capricious beauty of the original work, still unphotographed and unpublished.

Seven miles out of Segovia, at the foot of the high mountain range lies the royal palace and park of La Granja (The Grange), or San Ildefonso. During the reign of the fifth Philip, around 1720, when the French influence was at its height, the monarch, who wanted a place to which he could retreat from Madrid to enjoy the bracing air of the mountains, purchased the "grange" of the Monks of El Parral near the village of San Ildefonso among

the pine woods of the Guadarramas, 3907 feet above the sea. As he was the first and loftiest of all earthly sovereigns, his courtiers said, so his abode should soar nearest to heaven. The French architects Cartier and Boutelet were summoned and the work was started. The cold and sparkling mountain streams were diverted into reservoirs and artificial cascades, walks, parterres and rond points created, statues of marble and lead set up and one day in the year 1727 all was ready and the water was turned on. One can imagine the scene; the blase monarch, already sick of the vast expense, the fawning courtiers and the anxious architects (or maybe their "representative") fearful lest something should go wrong at the crucial moment, all gathered in front of the palace. The signal was given, and the crystal water came leaping down the marble fountains and gurgling through the throats of the leaden turtles and frogs. Undoubtedly the band played the national anthem. The crowd stood hushed, waiting for the royal verdict. The king gazed silently at the display and walked moodily along the alleys a short distance and eyed the glittering throng. "It has cost me three millions" said he, "and I have been amused three minutes." What an epitome of royal boredom is contained in that remark!

The park and chateau are well kept up and the cool groves offer a pleasant contrast to the dusty countryside. The heavy baroque interior of the palace is amusing as an illustration of what "art" can become at times, but the living quarters (with their single bathroom for the king in person) are cheerful, and the vista from the balcony up the cascade to the dark green of the pine clad mountains and the craggy heights of the Penalara is delightful.

Segovia with its honest and pleasant population would have held us much longer, but the "interlude" was passing and the Guadarramas beckoned us see what was beyond, so regretfully, like closing a half read book, one evening we got aboard the train and passing the dark gorges of the mountains descended the long slope into New Castile and Madrid.



STANTON, IN THE COTSWOLDS

THE PICTORIAL ASPECT OF OLD ENGLISH TOWNS

By WILLIAM PITKIN, JR. AND SEWARD H. MOTT, *Landscape Architects*

THE practicing architect or landscape architect contemplating a trip through England may plan to travel by train or charabanc between the important towns or along the beaten paths followed by the tourist, but will find that the automobile provides the only practical way of reaching the many, many small towns and villages which in reality are so largely responsible for the creation of the mental pictures which one carries away. Those memories of fascinating compositions, of delightful details, and of exquisite color; in fact, all those component parts which together make up the sheer loveliness and real beauty of picturesque rural England.

For the motorist, there exists all the romance of the discoverer, as he is privileged to wander at will, varying from the day's program to suit every whim, and to turn left or right toward a beckoning church spire or an intriguing composition of roof lines.

However, if he desires to slow up or stop at any time he pleases, he must dispense with the services of a chauffeur, for only the spirit attuned to the mysteries of architectural beauty can distinguish on the advancing skyline or down the cross-roads the existence of something architecturally worth while. The chauffeur will carry one by before its presence has been more than sensed, whereas in doing one's own driving the brakes will be instinctively applied at the first glimpse of an interesting object.

While in the larger cities of England one is entranced by the beauty of individual buildings or groups, the small towns hold one by the completeness of the picture they present. The instant, vivid impression is one of harmony in design and in materials, and seldom is a discordant note discovered.

This atmosphere of complete harmony is evident to an unusual degree in Stanton, one of the gems of the Cotswold district, where it is apparent that all the buildings were erected at the same time (approximately 1600) by master craftsmen working under capable direction. This continuity of style in many of these small towns is due in large part to the fact that these were communities made up of the workers on great estates where all the building was under one control.

The native stone used in their work, and now softly mellowed by time, expresses not only the substantial character of the buildings, but also the honesty and solidity of the people as well. Throughout all this district one is conscious of the fine feeling which these craftsmen possessed for proportion in mass and in detail. The cottages of the simplest laborer often reflect a talent for design which, so far as the exterior is concerned, would make them worthy of positions of prominence in our finest residential developments.

As one journeys through England these small towns will be continually changing their dress, as it were, due, of course, to the changes in the prevailing building material, for it is practically a universal custom to use that which is available. These changes from stone to plaster, to brick and to half-timber are tremendously interesting to observe and make one wonder whether there may be similar changes in the natures of the dwellers themselves.

These variations in dress are not limited to the materials used, but include distinct changes in color as well.

In the Cotswolds, gray is the predominating tone, often a warm satisfying gray, especially when the sun is shining on walls still damp from a recent shower, and never an absolutely cold gray, for always the kindly effects of time have softened and shaded materials which may perhaps have originally lacked all feelings of warmth.

The towns in which half-timber and brick are most commonly used, completely satisfy the desire for color for beams weathered through centuries or painted frequently for protection, are tremendously effective in conjunction with age-old brick which may even attain that delectable plum color of the Bishop's house at Windsor Castle.

Plaster, too, offers a medium for color values which vary widely in different localities, reaching the zenith of attractiveness in the delightful pink houses of Porlock and Meinhead in Devon and Quendon in Essex.

Another and decidedly pronounced characteristic contributing to the pictorial interest of these English small towns is the relation of the individ-

ual buildings to each other and to the thoroughfare.

The American realtor who insists on uniform building lines and standard street widths would suffer horribly on viewing these towns, or would have to admit the error of his methods and concede that charm is the result of variety and not of monotony.

For to a great extent the delightful pictures which are continually opening to the visitor are due to the wayward roadway and the "happenstance" grouping of buildings, some close to the road, some back, and some actually thrusting forward into the road, thus causing it continually to contract and swell out again as it winds its way through the town. Often these sudden widenings in the roadway are used for fountains, Queen Eleanor crosses, and, since the war, for memorials to the dead whose numbers are so startlingly large in proportion to the size of the towns.

In such a variety of ways do the inhabitants of these small towns treat their frontage on the highway that it is a continual joy to study each individual case.

Here the door opens directly into the road, making it necessary to drive with unusual care so as to avoid the children who may suddenly pour out in front of the car. Often a stone wall closely borders the roadway, shutting out the public and enclosing a tiny garden filled to overflowing with a mass of bloom. At other times hedges and fences replace the walls, and the Englishman never fails to keep his hedge closely clipped, or overlooks an opportunity to make his gate and fence interesting in design as well as substantial in construction.



STANTON, IN THE COTSWOLDS



BYFIELD, NEAR WARWICK



WARWICK



SLAUGHTER



AN ALMSHOUSE IN THE COTSWOLDS



A COTSWOLD ROADSIDE



KIDDINGTON, OXFORDSHIRE



ALMSHOUSE, CHIPPING CAMDEN



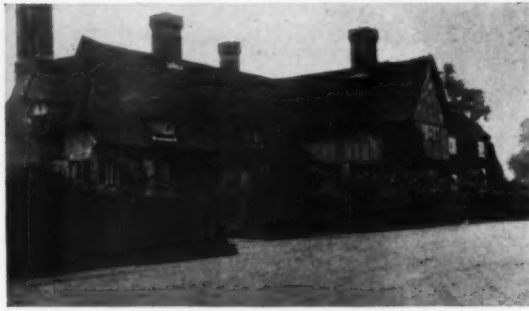
BURTON-ON-WEIR

The cottage gardens of southern England are an ever re-occurring delight. The humblest home displays an amazing wealth of blossom which betokens many hours of loving care, and many of these gardens are generously turned to the street for the greater enjoyment of all and for the glorification of the entire neighborhood. How often one desires to open the gate in the wall and to be privileged to feel at home in these tiny flower-filled rooms!

Naturally such of these towns as are situated by the sea, or even along the Thames, possess a scenic value all their own, but all through rural England the traveler comes upon other towns located on little streams often dignified by the name of river. The towns so situated have a distinct charm and afford delightful opportunities for sketching and photography, while their quaint and beautifully proportioned bridges appeal greatly to the artist working in color.



THE STREET BELOW THE CASTLE, WARWICK



A MODERN COTTAGE, CHECKERTON

Roofs also contribute enormously to the picturesque quality of these old towns, and in different localities change as radically in style, material and color as do the houses themselves.

While the first glimpse of thatch produces a wild outburst of enthusiasm, one falls equally in love with the slate of the Cotswolds or the exceptionally heavy split flagstone found in parts of Sussex. But when one has driven over the purple heather-covered hills of Devon and dropping down a twenty-five per cent gradient toward the sea, suddenly catches sight of the red-tiled roofs of Lynmouth or Clovelly—well, it is impossible to do other than concede that a polygamous love for roofs is justifiable!

Nature has done much in enhancing the beauty of English roofs with her added coloring of moss and wild flowers which grow so luxuriantly, due to the climatic conditions. And the Englishmen ap-



IN THE COTSWOLDS

preciate this particular result of time, as is evidenced by the fact that much of the weathered and mossy roofing material is carefully preserved and is utilized in the houses now being built.

To the romantic spirit the quaint names borne by many of these little towns will be a cause of never-ending delight and many a side trip will be taken solely to justify the magnetic appeal of such names as Chipping Camden, Chiddingstone, Stow-on-the-Wold, Shipton-under-Wynchwood, Upper and Lower Swell, Fladbury, Byfield, Bishops Lydeard, Orchard Leigh, Godalming and Nettlebed.

Certainly these old towns offer inspiration for design in details, in form and in the use of materi-

als. But above all they create the pictures which are carried away in the storehouse of the mind, pictures which will live with one always, and which will surely draw one back again to England. Their appeal is not only to the eye and to the love for the beautiful and picturesque but penetrates deeply into the souls of most Americans. For these towns are those wherein our forefathers used to dwell, their loveliness was loved by them, and we of today must be dull indeed if we dwell in them for even a little while and fail to sense the spirit of Home.

An interesting series of pictures of old English roofs will appear in a later issue.



STANTON, IN THE COTSWOLDS

A GARDEN CITY FOR GLASGOW

A GARDEN city is proposed for Glasgow, writes *The Architects' Journal*, London. No definite site has yet been acquired, but a company, known as "Third Garden City, Ltd.," has been formed, having an authorized capital of £10,000. The object of this preliminary company is to form public opinion in favor of the establishment of garden cities and to "prospect for, investigate and purchase a site in the west of Scotland for Third Garden City, or to enter into an agreement for such purchase on behalf of a company to be promoted to carry out the Third Garden City undertaken." The first com-

pany is busy creating an interest in the subject, and it is hoped that manufacturers may be found willing to co-operate and erect new factories, as has been done at Letchworth and Welwyn. The "Formation of public opinion in favor of garden cities" should not be a difficult matter in Glasgow, where slum conditions and traffic problems are acute, the latter accentuated by the difficulties of cross-river communication which have faced the civic fathers for so long. A satellite city, such as proposed, is a sound proposition from every point of view, and it is to be hoped, not only that the time will not be long before Third Garden City materializes, but that it will be speedily followed by others.



EDITORIAL COMMENT



RESOLUTION No. 7, as set forth in the report of the Board of Directors to the fifty-ninth annual convention of The American Institute of Architects, reads:

Resolved, That The American Institute of Architects offer its active co-operation with such organizations as may seem desirable toward securing a home in which foreign students of the Arts coming to this country may be welcomed.

This resolution was proposed by the Committee on Foreign Relations. It is in line with the well directed work of that committee, and is a suggestion that should not be permitted to pass unnoticed.

The success of every "quarter" in foreign cities—the Latin Quarter in Paris is a prominent example—has been the result of the herding together of men of similar aims or purposes. Clubs that aim to promote a closer relation between men who are engaged in the same professions have been more or less successful.

International House, a large and recently erected building on Riverside Drive in New York, made possible through the munificence of John D. Rockefeller, Jr., is a place where foreign students to universities in the metropolitan district may find congenial quarters, and where they mingle with men and women from other countries. The foreign student is more or less beset by loneliness and handicapped by conditions set up by poor social environment. International House has, we learn, been successful from the very start, as it was designed and planned to provide the foreign student with a comfortable home and make his daily association pleasant and helpful. Educators are agreed that community houses of this type are highly desirable, and it is predicted that it will not be many years before similar buildings will be built in many large university centers.

It is, therefore, evident that the Committee on Foreign Relations, in proposing this scheme, is directly in step with the best modern movement to increase the opportunities of the foreign student in this country.

An international house for the Fine Arts would be a wonderfully progressive thing to secure. The plan for such a building would no doubt be received with approval by The National Academy, The National Sculpture Society, The Beaux-Arts Society, and, in fact, every representative society engaged in educational effort. The matter is of sufficient importance to warrant its being kept alive until some result is secured.

AN INTERESTING point as to the authority of the Institute over the profession at large, and its punitive power in case of disregard or infraction of the laws as to professional practice as set forth in the code, was made during the debate on Allied Architects' Associations on the morning of the last day of the convention.

John Austin of Los Angeles, having the floor, proceeded at some length in criticism of the Allied Architects' Association in his city, concluding his remarks with the presentation of a resolution to the effect "That it is the sense of this convention that all such organizations be requested to disband, as they are not for the best interest of the profession." During the discussion preceding the putting of the motion, Mr. Austin made it clear that he did not desire condemnation on the part of the Institute, and insisted that the Allied Architects' Association be "requested" to disband.

Mr. Holden of New York believed, he said, that such a resolution, if passed, would be likely to place the Institute in a ridiculous position. If the organization, for reasons of its own, did not disband, the Institute would be in a position where drastic action would have to be taken to uphold its authority. To this Mr. Austin countered with the statement that, in his judgment, he did not believe either the convention or the Board of Directors had authority or jurisdiction in the matter. Mr. Austin again emphasized that point in his resolution, that The American Institute of Architects did not approve of the organization of Allied Architects' Associations.

The point that was most clearly brought out by the discussion of this resolution was that the Institute had no power to restrain or punish any action on the part of groups of architects that it was believed was not to the best interest of the profession. Just how to establish that authority, to give the Institute legal control over its members, if such a thing is desirable, is something worth serious consideration.

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WHILE Mr. Beers, Chairman of the Committee on Public Information, and Mr. Corbett, member of that committee, had at some length placed before the convention a proposed plan for securing a better appreciation on the part of the general public of the value of architectural service, it remained for Mr. Pfeiffer of Florida to bring to the notice of the convention a condition that in the judgment of many is of equal importance. Addressing the con-

vention, Mr. Pfeiffer stated that for the past six years he had held the office of Supervising Architect in the State of Florida. He said that it was his duty to approve all plans filed, in accordance with the State Code, and that he has, therefore, had excellent opportunity to observe the product of the average architect. That by "average architect" he did not mean the average in Florida, as, for a matter of fact, "the majority of plans prepared and submitted were by practitioners who have previously practiced in other states, some of whom have quite a reputation." He found the average plan sorely inadequate and incomplete, and that many have to be returned, as there was a complete lack of detail. For that reason, he said, it was unreasonable to expect mill men and manufacturers to make intelligent cost estimates. He decried the failure of architects to keep in contact with clients, and the delegation to subordinates of functions that the architect might reasonably be expected to perform. To correct these, to him, evils, he stated he was not just then prepared to present a motion, but he did desire to suggest that if there is any possibility on the part of the press of the Institute to have prepared and presented educational articles with reference to the duties of architects toward the various parties with whom they maintain professional relations, it would be a step in the right direction.

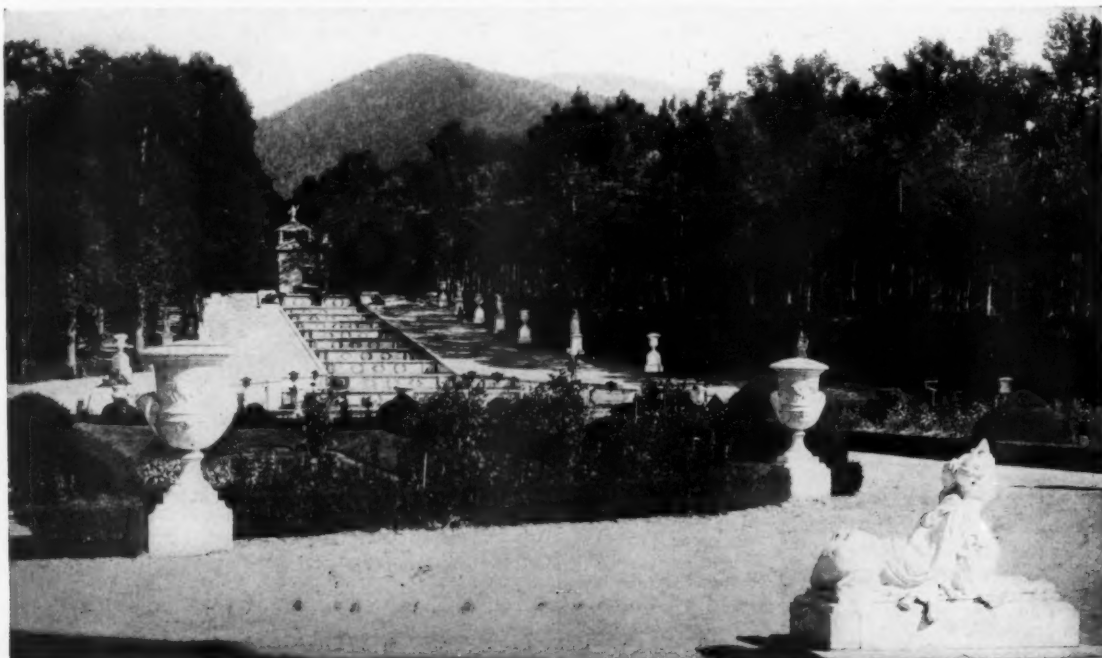
Mr. Pfeiffer further stated that by performing his functions with greater care and skill the architect would accomplish something that would work to the practical advantage of the profession at large.

Coming at almost the closing hour of the con-

vention, this matter was not discussed, but it is believed that the point made is a good one, and that any propaganda of public information might, to good purpose, be linked with propaganda inside the profession. For, it is possible that some of the evils we now deplore are of our own creation.

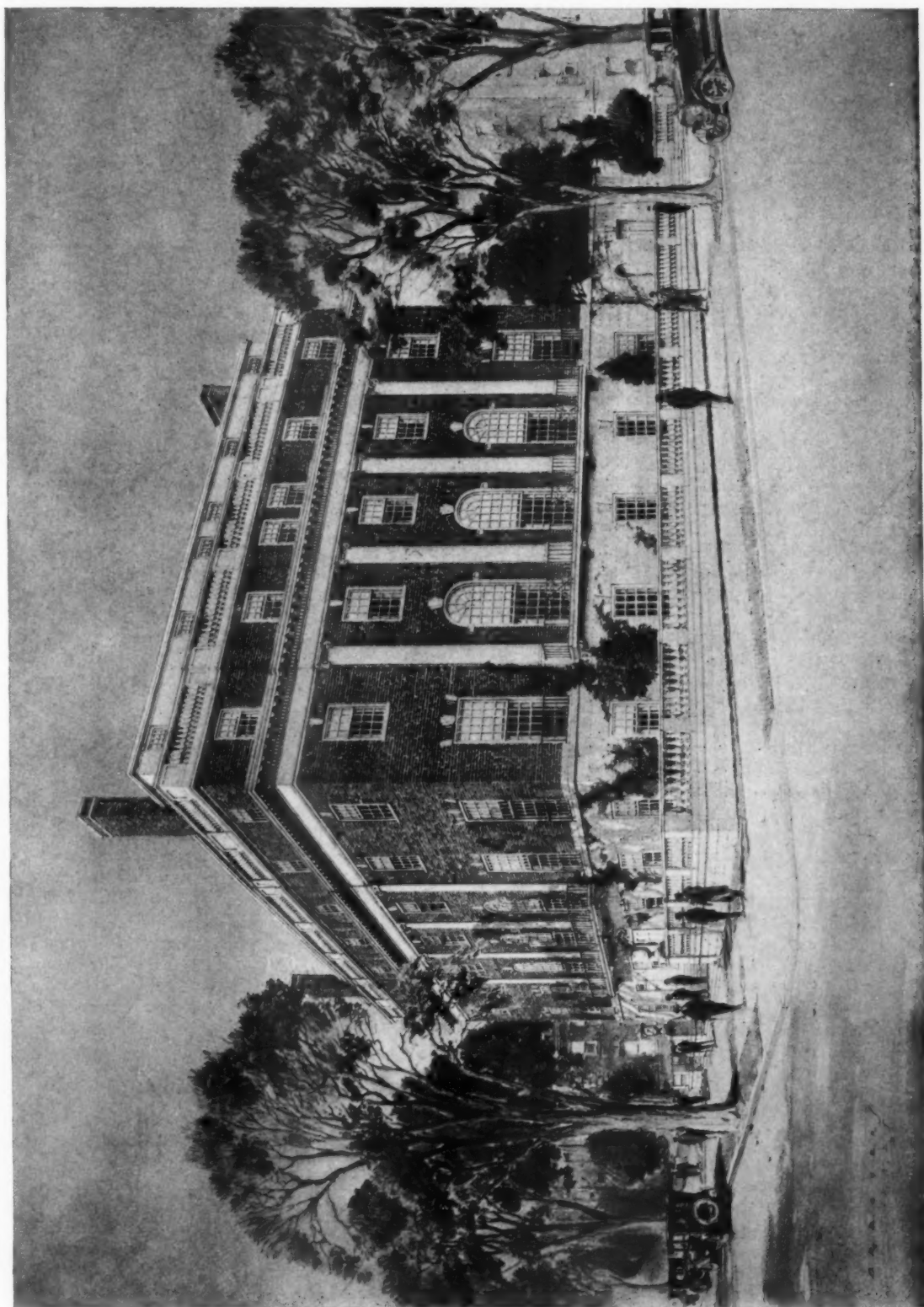
WE LEARN from a communication received from Alfred C. Bossom, who has been sojourning in Germany, that the recent architectural exhibition held in that country was one of unusual interest. Mr. Bossom states that Germany is deeply appreciative and interested in the exhibit of American architecture which was assembled in this country and sent over by special invitation. They apparently have a very dignified way in Germany of conveying an expression of approval. At the formal opening of the American exhibition in Hamburg, representatives of the Municipality and of the Hamburg Chapter of the German Institute of Architects were present. The addresses were most complimentary and appreciative, and the intention to express the high regard for American work was evident.

It would seem that Dr. Edmund Schuler, who visited this country last year and who supervised the gathering of the material that forms the American exhibit, has done a tremendous piece of good propaganda work for American architecture throughout Germany and Austria. The thanks of the profession in this country are due Dr. Schuler for his very valuable effort in this connection.



SAN ILDEFONSO (LA GRANJA)

(See leading article, "A Spanish Interlude")



UNIVERSITY CLUB, MILWAUKEE, WIS.
JOHN RUSSELL POPE, ARCHITECT
(See description on back)

THE AMERICAN ARCHITECT
June 5, 1926 PLATE 121

UNIVERSITY CLUB, MILWAUKEE, WIS.

JOHN RUSSELL POPE, *Architect*

CLUB life in this country does not materially differ from similar contacts all over the world. It is everywhere founded on congeniality and the social intimacy so very desirable between men of similar tastes or similar occupations. As supplementing the usual educational courses of universities, colleges and schools, clubs that comprise university-bred men, become in a sense post-graduate institutions.

There is ever present a sense of fraternal feeling. The pride that men take in their clubs, and the attachment they feel toward them is only second to the pride in their Alma Mater. Men are essentially social animals, they herd with their kind, and they are ever sympathetically in accord with other men whose early experiences have followed along lines similar to their own.

A good example as to the extent to which club organizations will proceed in dignifying their surroundings is to be seen in the University Club of Milwaukee. This flourishing organization has successfully gone through three stages of expansion. From modest but homelike quarters in a converted private house, when the club was founded in 1898, they were forced to move to a larger house on Jefferson Avenue. But the University Club had become a necessity to the college-bred man, and the facilities for the best conceived club life had been so successfully provided that the question of a new house, one that would provide for possible expansion for many years, was again discussed.

It does not seem necessary to dwell at great length on the architectural excellence of this building. The designs submitted by the Office of John Russell Pope, architect, very completely present this Club House. Undoubtedly it will rank among the best of structures designed to carry out the traditions of the Georgian style, a style that marked the buildings that comprised college groups during the earliest periods of our history.

The University Club of Milwaukee is located at the corner of Oneida Street and Juneau Place. It commands an uninterrupted view of Juneau Park and Lake Michigan, and is ideally placed to provide the most attractive outlook at all seasons of the year. As at present planned, the building, while now a complete and self-contained structure, does not occupy the entire site. As may be seen by reference to the perspective view, there has been left for future extension a certain part of the Juneau Place

elevation. The architect has planned, when the expansion of the club warrants, to carry the structure to the limits of the property. This expansion in no way will affect the present very well conceived plan as relating to the various floors. Each subdivision, as at present laid out, will become extended into the added building, thus expanding, but in no wise changing, the plan as presented in this issue.

The entrance to this club house is on Oneida Street, leaving the east facade facing Lake Michigan unbroken.

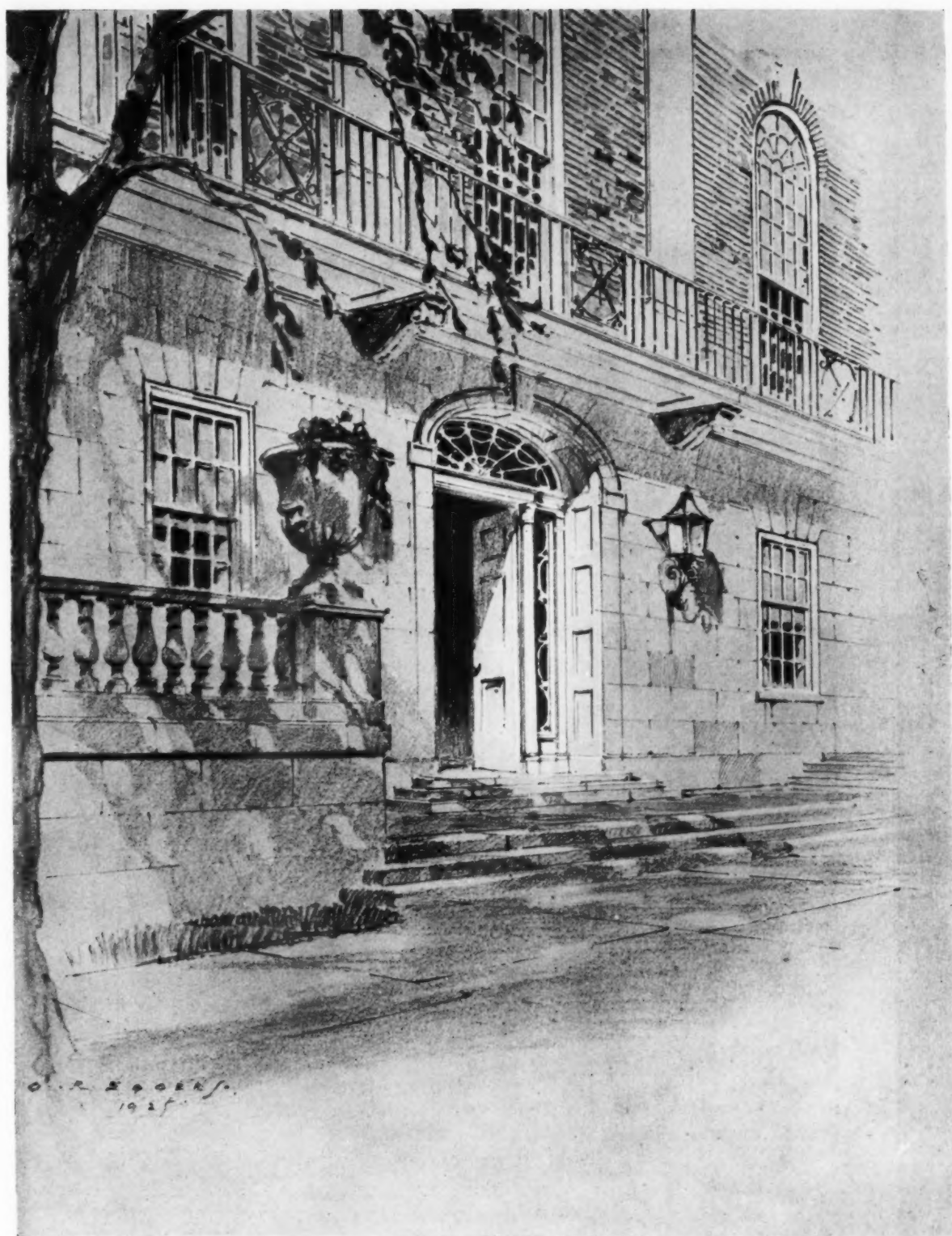
The plans of the various floors are reproduced, and while they will be readily read, it may not be out of place to direct attention to certain features that show how carefully the problems of planning have been studied and how admirably they permit the freest and most enjoyable use of the entire club house. The living room, 30 x 70 feet, extends entirely along the Lake frontage of the building. It has easy access to the wide terraces on both fronts and, as will be seen by reference to the illustration, is a room of fine proportions supplementing the architecture as expressed on the exterior.

On the second floor directly above the living room is the dining room. The outlook from this room could not be more attractive. Large fireplaces are at either end and the daylighting is such that the room will, during all hours of the day, be one of unusual attractiveness. Grouped on this second floor are the banquet room, the ladies' dining room and the private dining room. It will be noted that the ladies' dining room has a separate entrance and a separate elevator, with adequate retiring rooms, all separate and distinct from the rest of the club.

The kitchen is unusually large and in its present size will not require expansion to meet the needs of service when the house is built to cover the site entirely. This second floor and many of its details of planning are unusual and a very attractive part of a well considered club building.

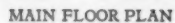
On the upper floors the plan provides for fifty-two sleeping rooms, all as more particularly shown on accompanying plans.

Contrast the planning of this club with that of clubs fifty years ago when they were erected and conducted on traditions brought over from Europe. Its large rooms and high ceilings are not to be compared with the restricted quarters of the early type. In spite of the large scale there remains a sense of restfulness and good taste.

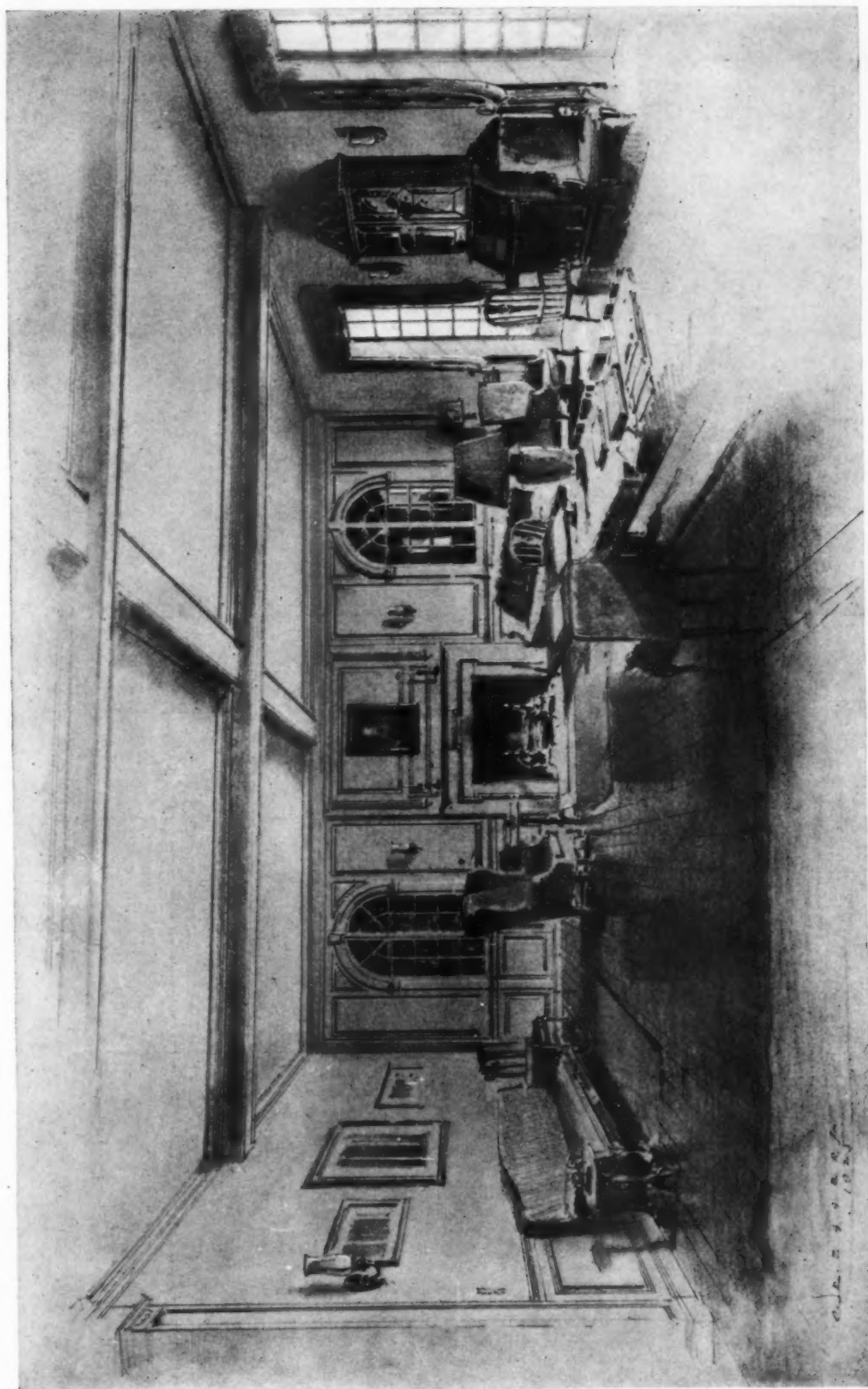


MAIN ENTRANCE
 UNIVERSITY CLUB, MILWAUKEE, WIS.
 JOHN RUSSELL POPE, ARCHITECT
(See plans on back)

THE AMERICAN ARCHITECT
 June 5, 1926 PLATE 122



JOHN RUSSELL POPE, ARCHITECT



LIVING ROOM
UNIVERSITY CLUB, MILWAUKEE, WIS.
JOHN RUSSELL POPE, ARCHITECT
(See plans on back)

THE AMERICAN ARCHITECT
June 5, 1926 PLATE 123

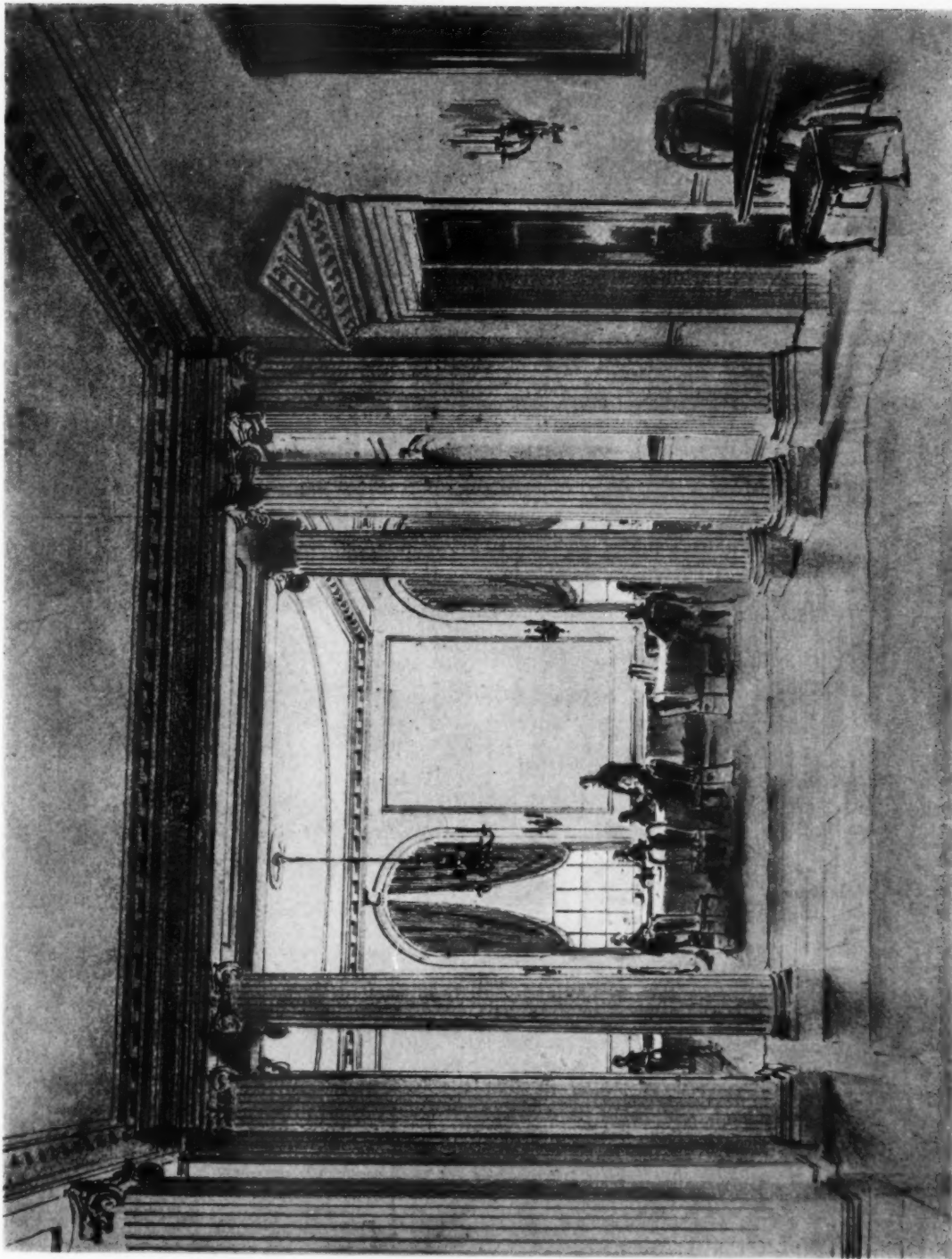


FOURTH FLOOR PLAN



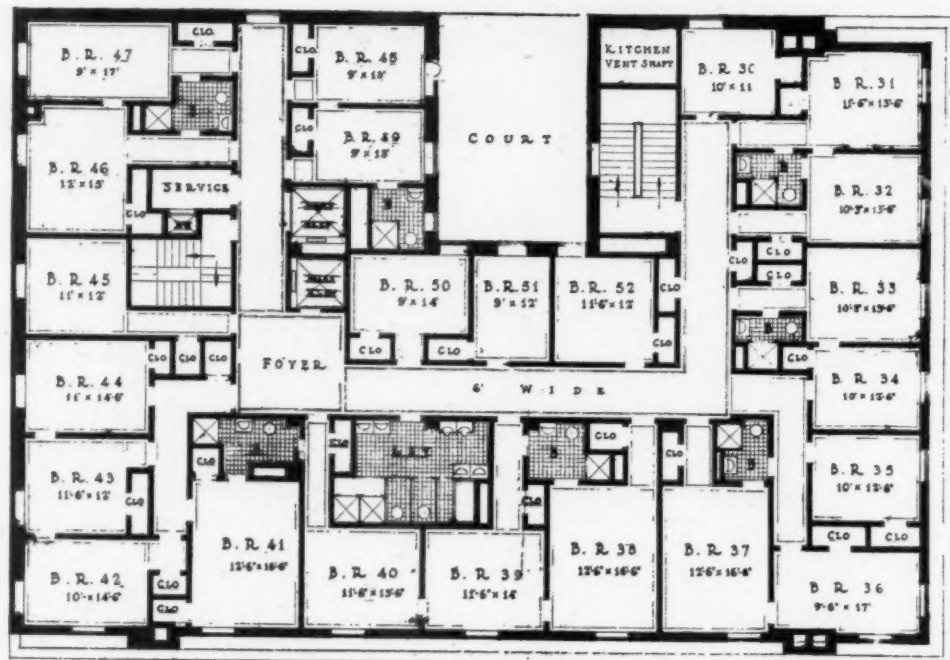
THIRD FLOOR PLAN

UNIVERSITY CLUB, MILWAUKEE, WIS.
JOHN RUSSELL POPE, ARCHITECT

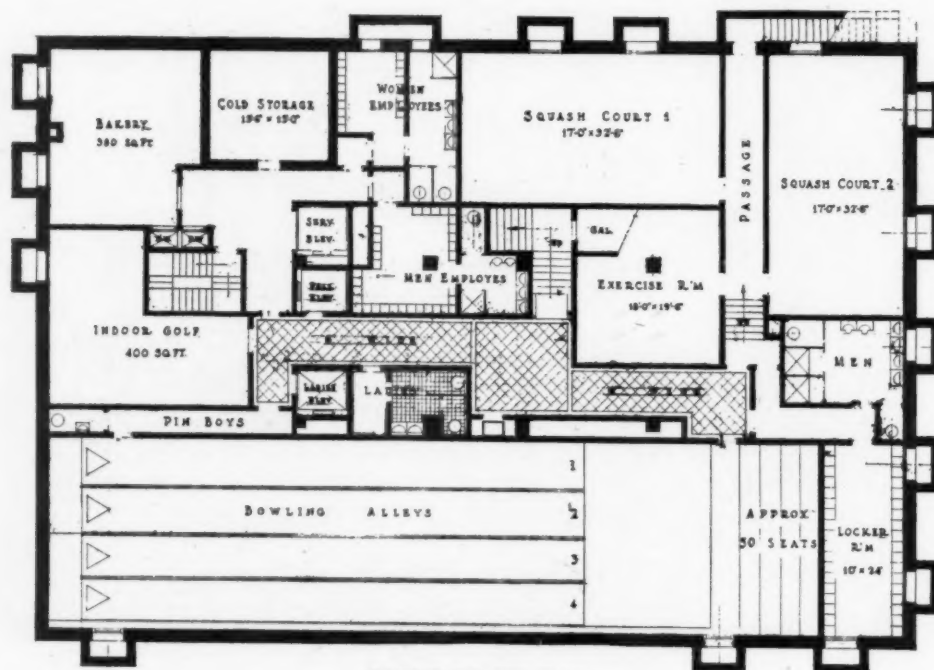


ENTRANCE TO MAIN DINING ROOM
UNIVERSITY CLUB, MILWAUKEE, WIS.
JOHN RUSSELL POPE, ARCHITECT
(See plans on back)

THE AMERICAN ARCHITECT
June 5, 1926 PLATE 124



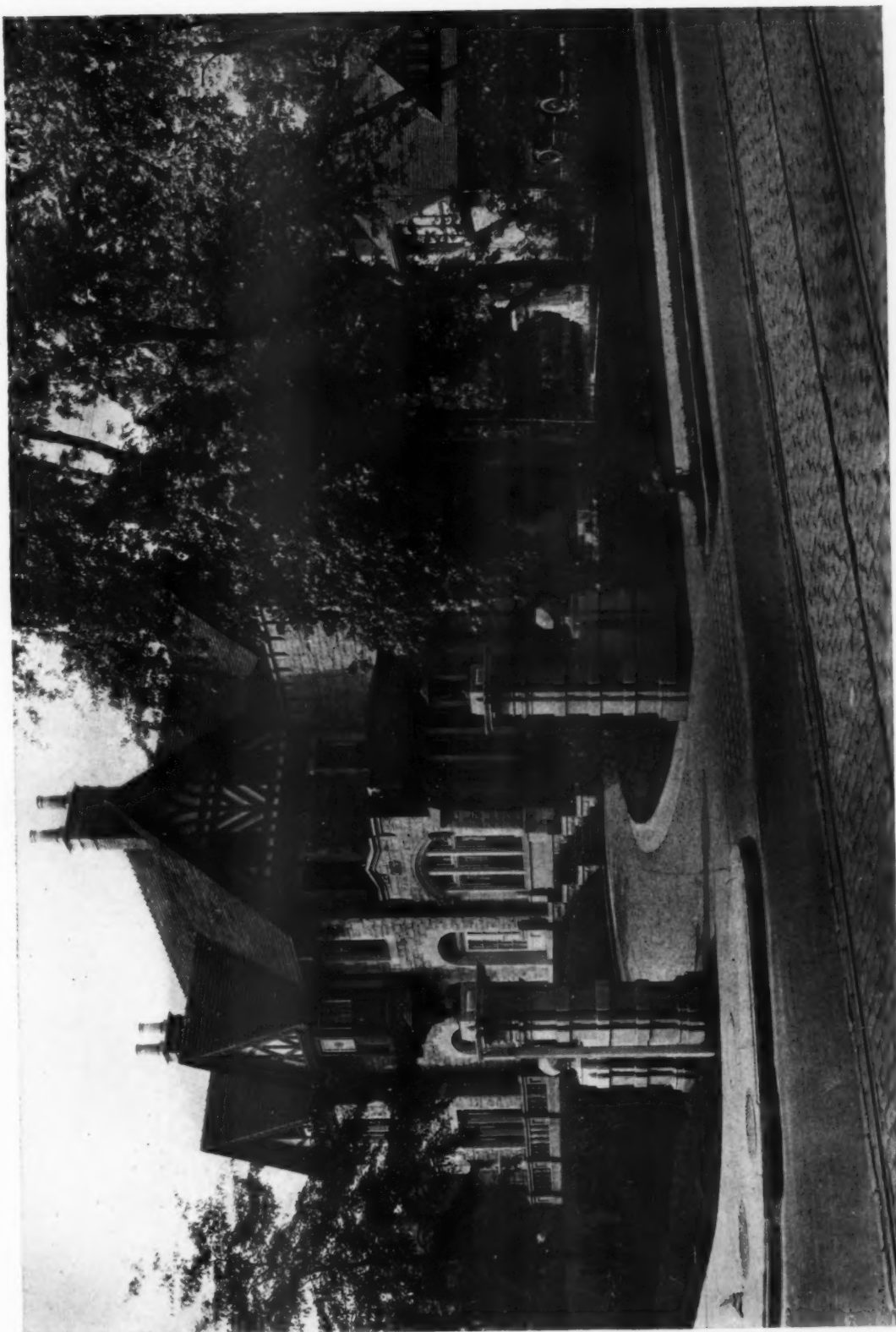
FIFTH FLOOR PLAN



BASEMENT FLOOR PLAN

UNIVERSITY CLUB, MILWAUKEE, WIS.

JOHN RUSSELL POPE, ARCHITECT

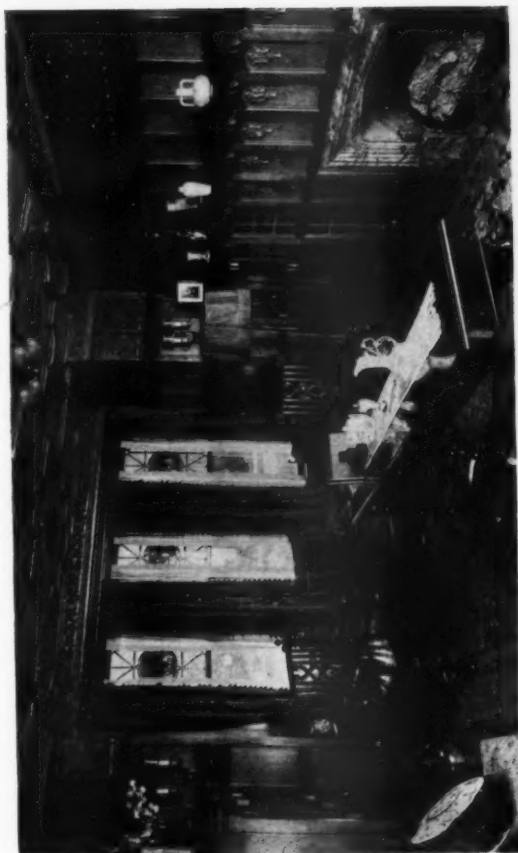


HOUSE OF J. L. KENDALL, PITTSBURGH, PA.
M. NIRDLINGER, ARCHITECT

THE AMERICAN ARCHITECT
June 5, 1926 PLATE 125



THE AMERICAN ARCHITECT
June 5, 1926 PLATE 126



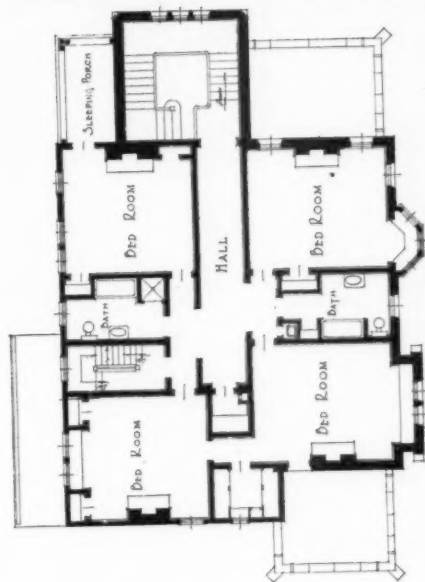
HOUSE OF J. L. KENDALL, PITTSBURGH, PA.
M. NIRDLINGER, ARCHITECT



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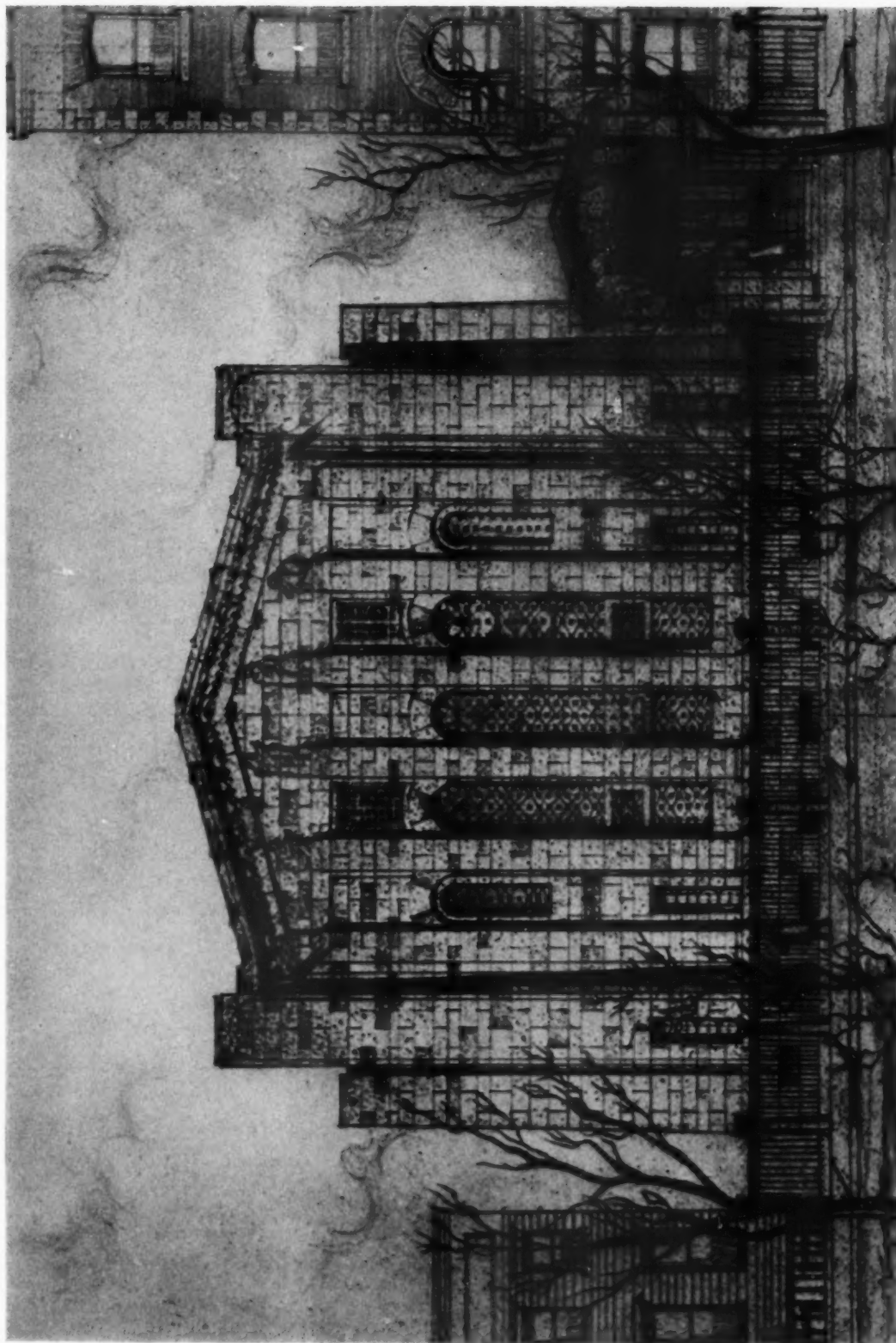
HOUSE OF
J. L. KENDALL,
PITTSBURGH, PA.

M. NIRDLINGER,
ARCHITECT



THE AMERICAN ARCHITECT
June 5, 1926 PLATE 127





AUDITORIUM FOR PRATT INSTITUTE, BROOKLYN

JOHN MEAD HOWELLS, ARCHITECT

(From a drawing by Mr. Howells)

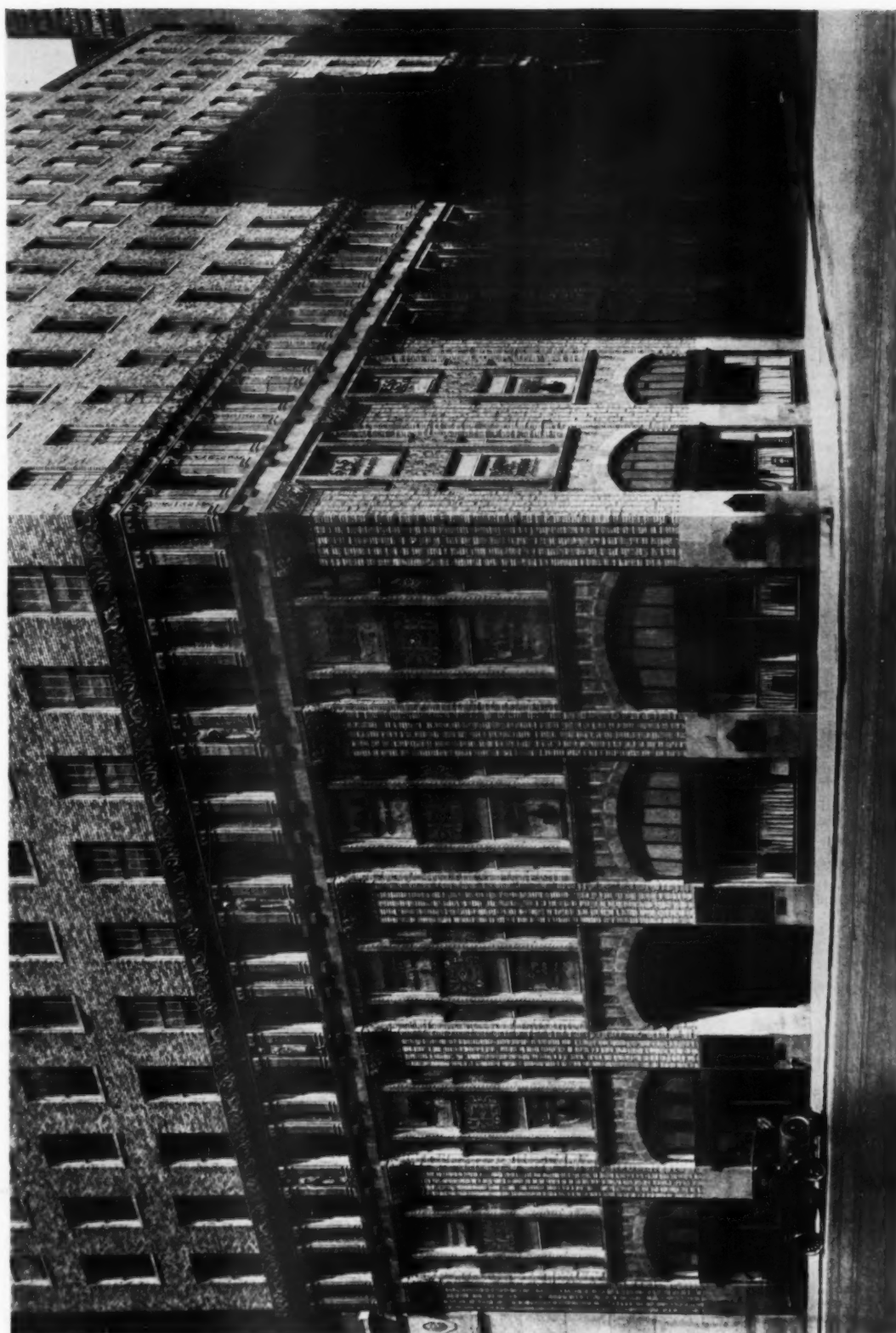
THE AMERICAN ARCHITECT

June 5, 1926 PLATE 128



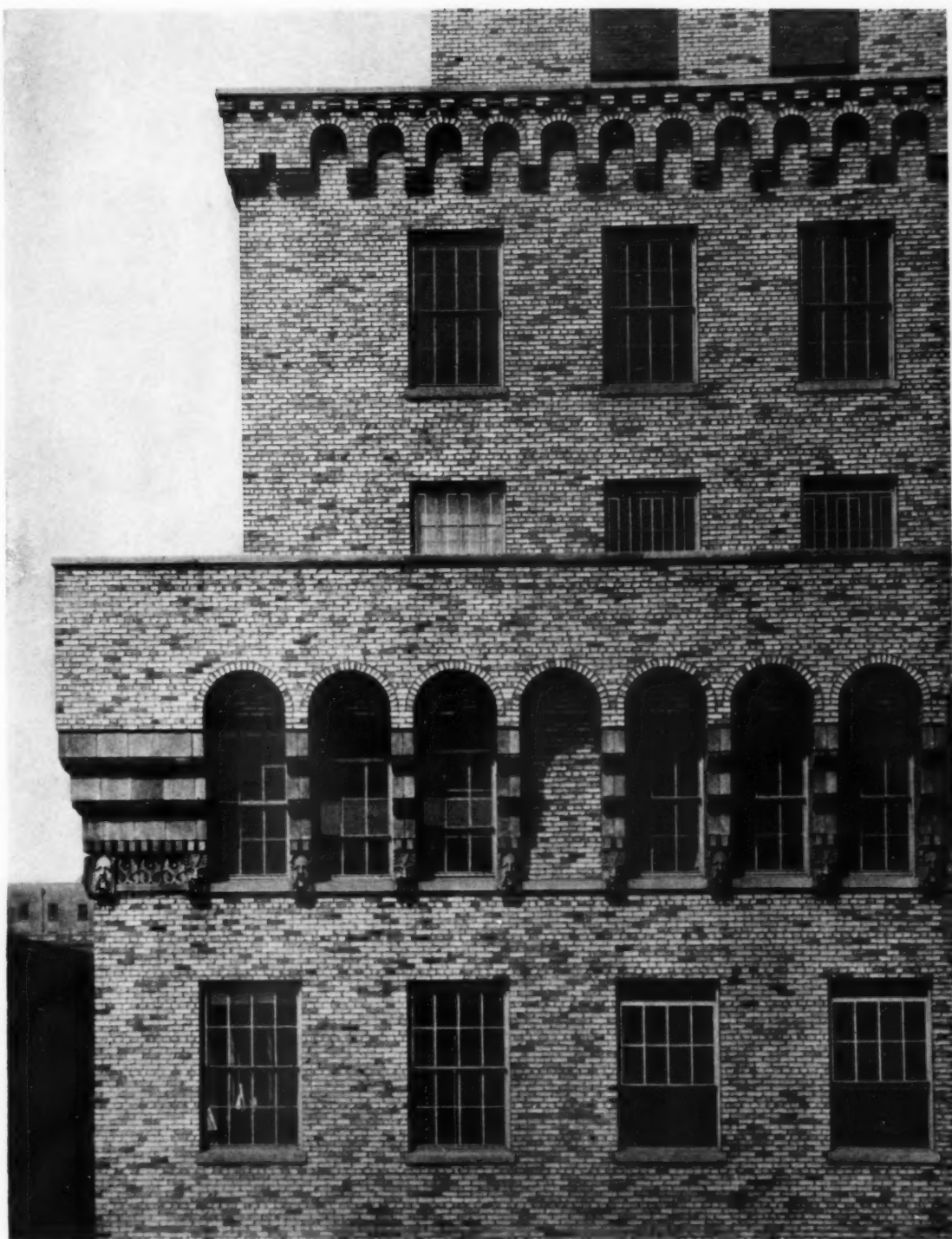
ARSENAL BUILDING, SEVENTH AVENUE, NEW YORK

BUCHMAN & KAHN, ARCHITECTS



DETAIL OF LOWER STORIES
 ARSENAL BUILDING, SEVENTH AVENUE, NEW YORK
 BUCHMAN & KAHN, ARCHITECTS

THE AMERICAN ARCHITECT
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DETAIL OF UPPER STORIES
 ARSENAL BUILDING, SEVENTH AVENUE, NEW YORK
 BUCHMAN & KAHN, ARCHITECTS

THE AMERICAN ARCHITECT
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DETAIL OF BRICKWORK, LOWER STORIES
 ARSENAL BUILDING, SEVENTH AVENUE, NEW YORK
 BUCHMAN & KAHN, ARCHITECTS

THE AMERICAN ARCHITECT
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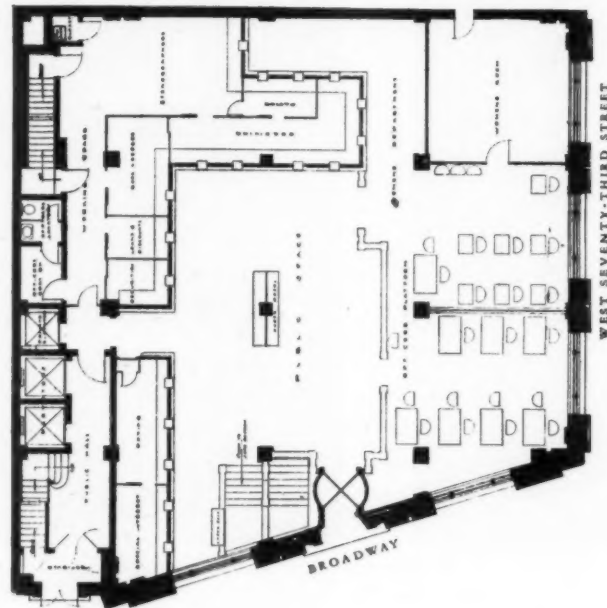


ABOVE: GENERAL VIEW OF BUILDING
 ABOVE AT RIGHT: MAIN BANKING ROOM
 BELOW AT RIGHT: SAFE DEPOSIT VAULT

BROADWAY AND 73RD STREET BRANCH, UNITED STATES
 MORTGAGE AND TRUST CO., NEW YORK

HENRY O. CHAPMAN, ARCHITECT
 (See plans on back)

THE AMERICAN ARCHITECT
 June 5, 1926 PLATE 133



BASEMENT AND MAIN BANKING FLOOR PLANS

BROADWAY AND 73RD STREET BRANCH, UNITED STATES MORTGAGE AND TRUST CO., NEW YORK

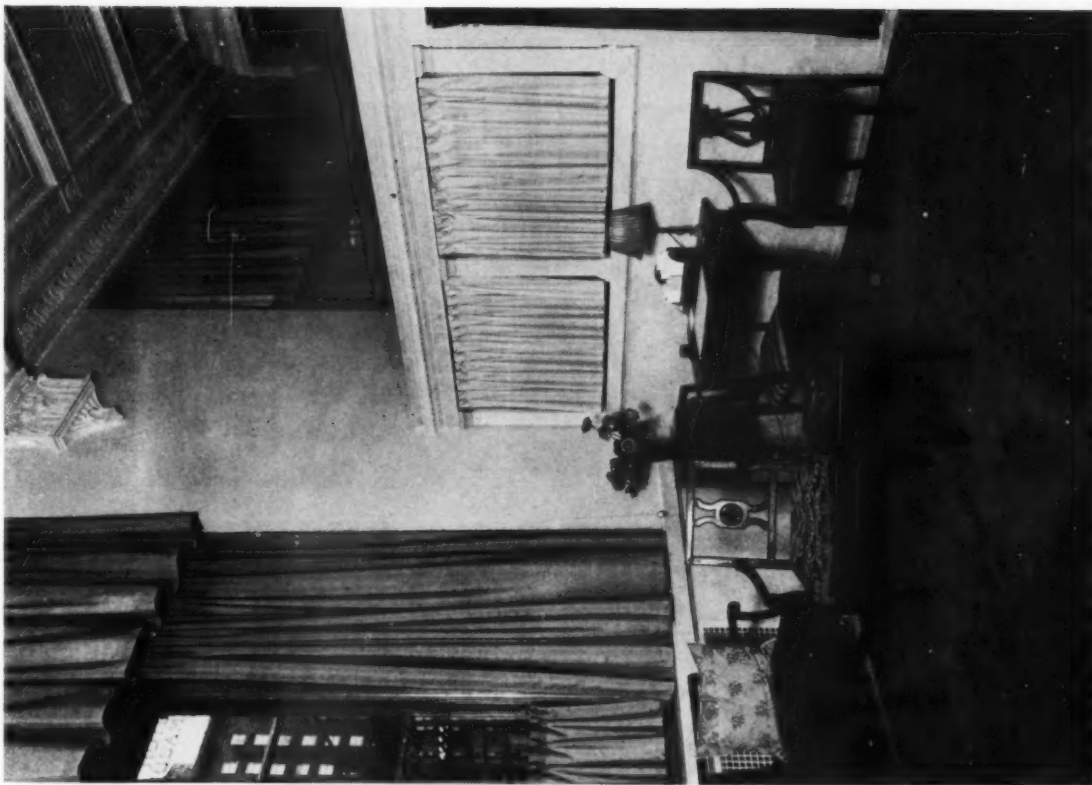
HENRY O. CHAPMAN, ARCHITECT



MAIN ENTRANCE

BROADWAY AND 73RD STREET BRANCH, UNITED STATES MORTGAGE AND TRUST CO., NEW YORK

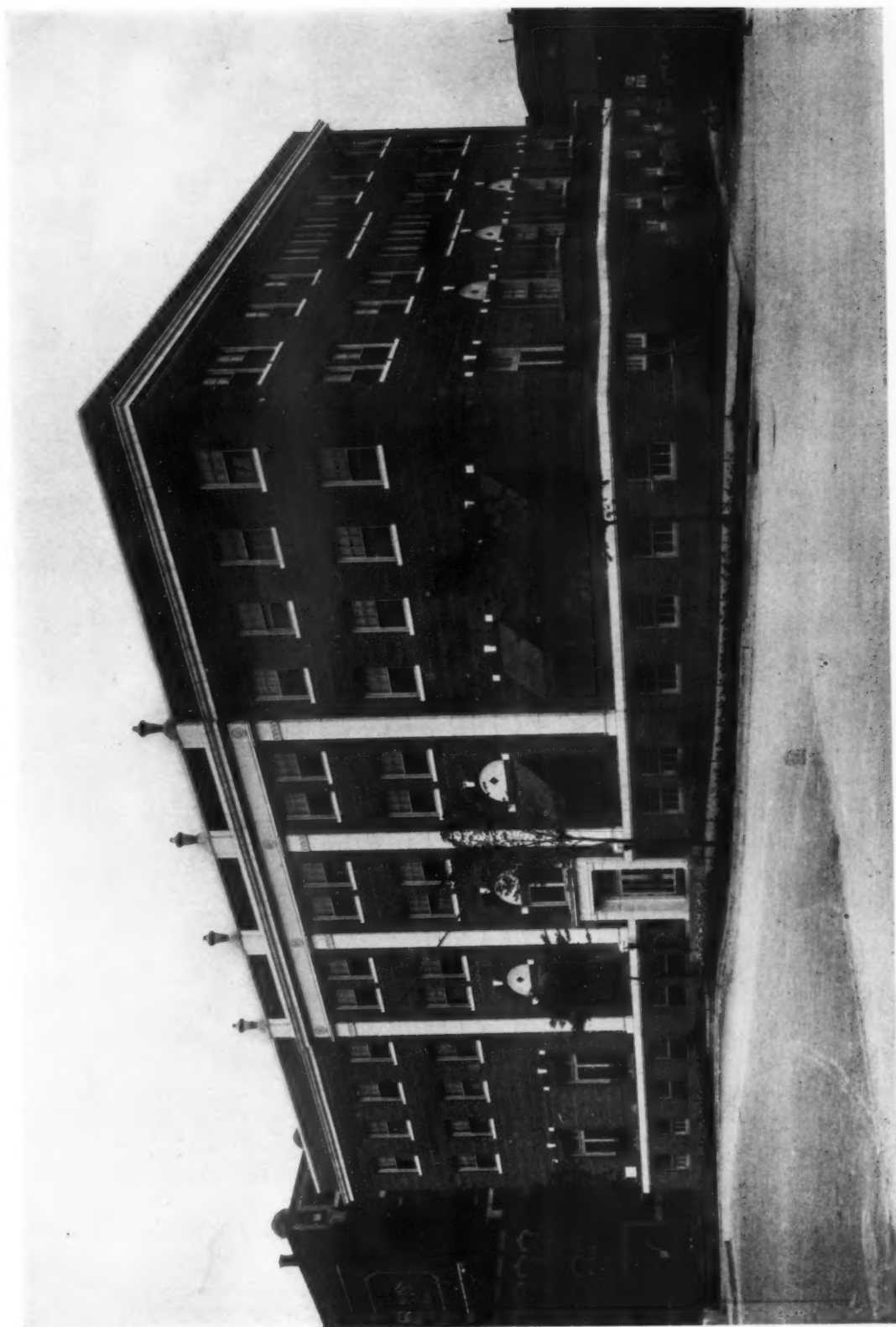
HENRY O. CHAPMAN, ARCHITECT



A CORNER OF THE WOMEN'S DEPARTMENT

THE AMERICAN ARCHITECT
June 5, 1926 PLATE 134



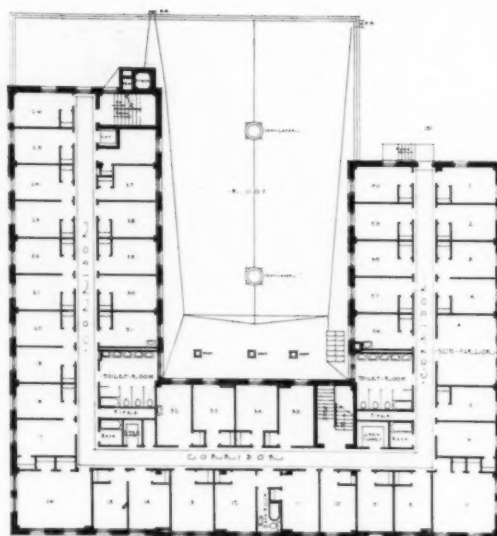


LEND-A-HAND CLUB, DAVENPORT, IOWA
CLAUSEN & KRUSE, ARCHITECTS
(See plans on back)

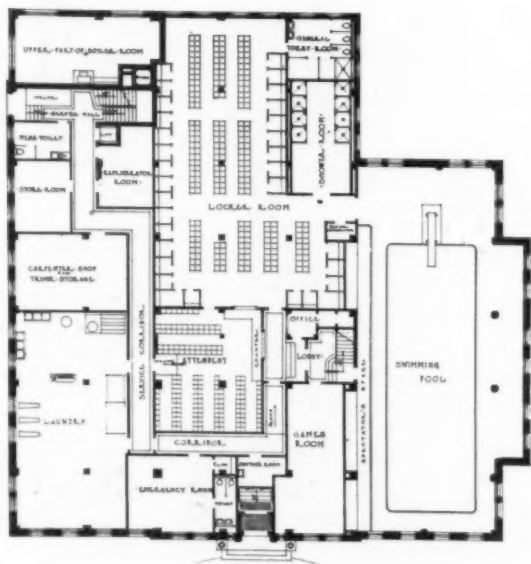
THE AMERICAN ARCHITECT
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FIRST FLOOR PLAN

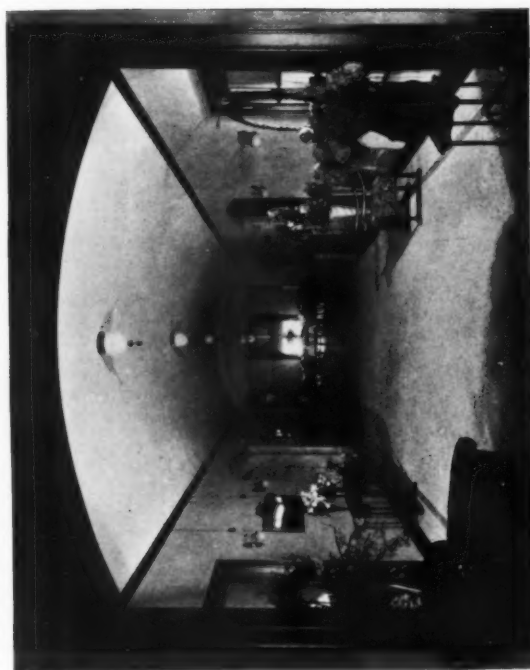


SECOND FLOOR PLAN
DORMITORY, LOCKER ROOMS,
TOILET ROOMS



LEND-A-HAND CLUB,
DAVENPORT, IOWA

CLAUSEN & KRUSE,
ARCHITECTS



LEND-A-HAND CLUB, DAVENPORT, IOWA
CLAUSEN & KRUSE, ARCHITECTS



THE AMERICAN ARCHITECT
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A PANORAMIC VIEW OF THE LIVING ROOM

"GAUDEAMUS"—A HOUSE IN BILTHOVEN, HOLLAND

FRANTS E. RÖNTGEN, *Architect*

OUR attention was first directed to this most unusual house by a prominent New York architect. He wrote us: "This house was done by a young architect of twenty-one. His father is the well-known Dutch musician and his brother is the Röntgen who played in the Kneisel quartette. This house he designed and built for his father. It has created a great deal of comment in Holland, and has resulted in bringing to this young architect a quantity of important work. In particular, the music room is very interesting. The brick balcony over the entrance shows that the curious Dutch skyscrapers that were entered in the Chicago *Tribune* competition were not what the Dutch considered queer, but exactly the right thing to do."

Later, and in correspondence with Mr. Röntgen, we learn that this house was constructed within the eight months from July, 1924, to March, 1925. The brick used are hand made, red in color. To create contrast, a yellowish sandstone is used between the windows.

The thatch-covered roof is 14 meters high, and contains two upper floors.

The music room is at a higher plane (0.80 cm. higher) than the rest of the house.

There is but one high chimney which serves for central heating and the kitchen stove.

The photographs reproduced herewith were made under the direct supervision of the architect.

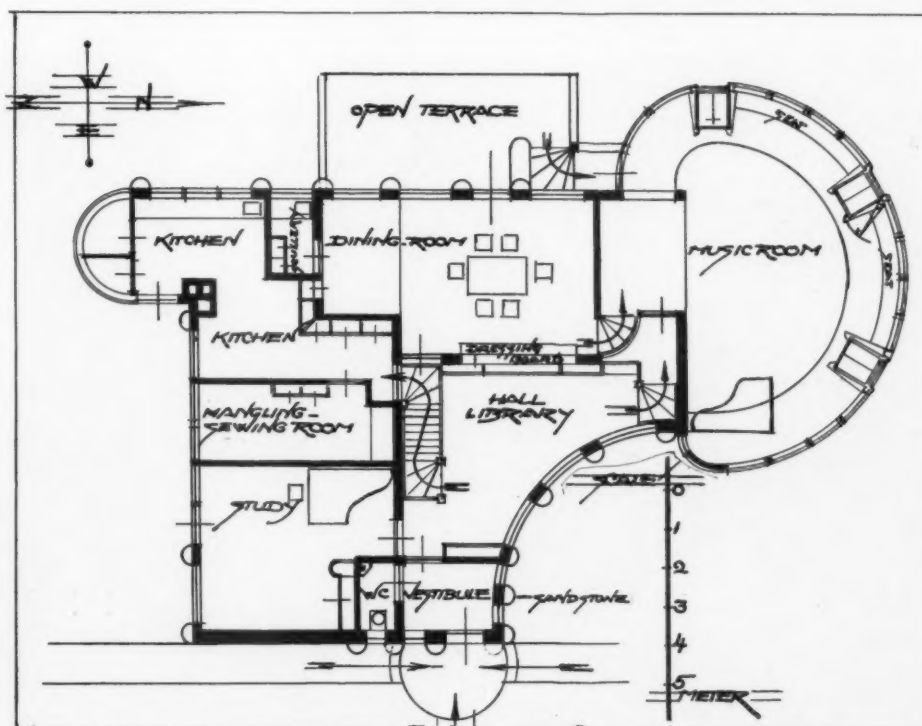
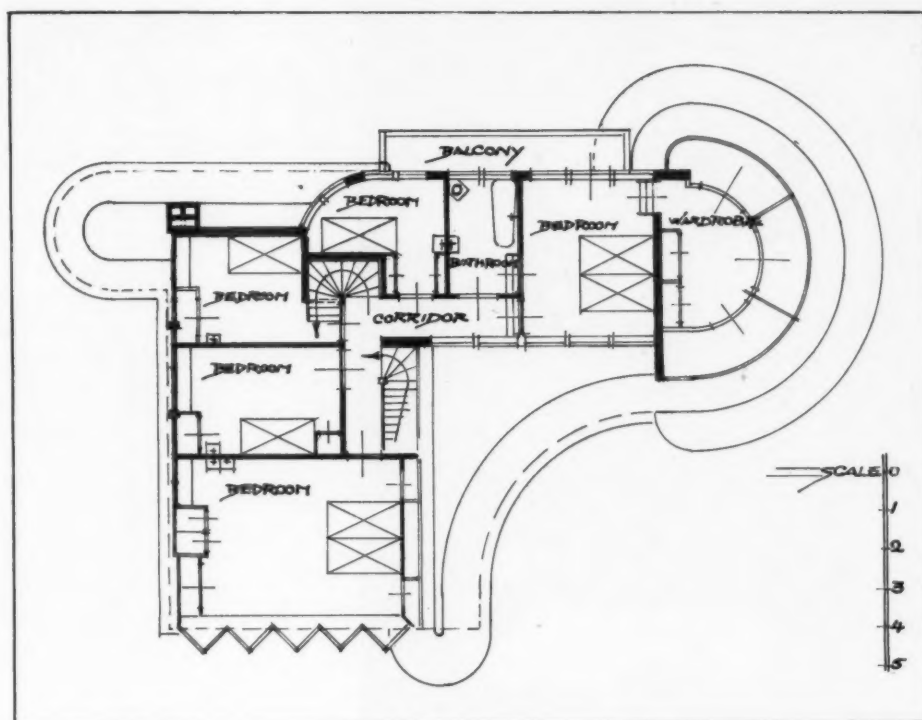


AN EXTERIOR DETAIL



"GAUDEAMUS"—A HOUSE IN BILTHOVEN, HOLLAND

FRANTS E. RÖNTGEN, ARCHITECT



"GAUDEAMUS"—A HOUSE IN BILTHOVEN, HOLLAND

FRANTS E. RÖNTGEN, ARCHITECT



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"GAUDEAMUS"—A HOUSE IN BILTHOVEN, HOLLAND
FRANTS E. RÖNTGEN, ARCHITECT

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INTERIOR ARCHITECTURE

ECONOMIC ADVANTAGES OF GOOD ARCHITECTURE AND DECORATION

THE present widespread interest of the public in things architectural, as has been often referred to in these articles, has resulted in appreciation of the commercial value of good architecture and decoration. The retail merchandiser was one of the first to give architecture this recognition, which it so rightfully deserved, and photographs of shops in various parts of this country have been reproduced in this journal to illustrate how generally this condition has been accepted. And, now, business and industry generally have been obliged to recognize the economic advantages of well-designed architecture and decoration, and offices of all kinds are more and more eliminating the commercial element by which their design and the design of their furnishings have so long been characterized, and replacing

it with a refinement of detail that adds considerably to its interest. The result shows a greater degree of satisfaction and contentment with their labors on the part of employees, and a marked tendency to raise the standards of the concern, as well as the product which it manufactures or finances, in the eyes of its employees and the public alike.

The field of operations of architects and decorators, previously of no small proportions, has thereby been tremendously increased so that now it appears to be almost unlimited. In the skyscraper, where most city offices are located, the problem of designing an office that shall be void of all commercialism is difficult. A skyscraper is, as a rule, planned and designed so that one floor is identical with another, each including only such details as



ELEVATOR HALL IN THE OFFICES OF THE POSTUM COMPANY, NEW YORK CITY

CHARLES M. HART, ARCHITECT



are necessary to its construction, so that to apportion the space to various concerns and give individuality to each is not an easy task. The offices of the Postum Cereal Company, Inc., of which Charles M. Hart was the architect, in the Postum Building, New York City, are decidedly satisfactory, and the design of the interior architecture and its decorations gives them individuality, and commercialism is not even suggested. The design is influenced throughout by early Colonial. In the adaptation of forms and motifs, which characterized the early settlers of this country, to the elevator lobby,—a purely modern convention,—and their interpretation in modern manufactured materials, the architect has been most successful. In the adjoining reception room, similar details cleverly conceal steel girders and massive columns,—elements of modern construction,—and comfortable and informal proportions—distinctly Colonial—are so emphasized that one never suspects that the windows overlook the skyline of the greatest city in the world, but rather would not be surprised if a gentleman in knee breeches and powdered wig entered at any moment. Antique furniture of authentic design carries out still further the early Colonial atmosphere, yet never fails in its purpose as a business medium.



RECEPTION ROOM, EASTERN OFFICES OF LEHIGH PORTLAND CEMENT COMPANY, NEW YORK CITY

CALLINGHAM-LLOYD, INC., ARCHITECTURAL DECORATORS

There is another phase to the design of offices which could not be considered in the case of the Postum Company, which immediately gives to a design the individuality that is vital to its success. The introduction into the structural or decorative scheme of a suggestion of the product the concern occupying the offices manufactures or finances has a certain advertising value. From an economic standpoint this feature in designing is always appreciated, and, in combination with other materials in a complete interior scheme, the product is suggested to its best advantage by demonstrating its possibilities and opportunities. In the Eastern offices of the Lehigh Portland Cement Company in New York City; this idea has been successfully employed by the decorators, Callingham-Lloyd, Inc. The walls of the hall and of several of the private offices, treated in cement in various adaptations, demonstrate the decorative value of cement in an architectural scheme. There were certain extensive alterations made to the structural plan of the building in connection with the laying out of these offices which increased considerably the opportunities for architectural and decorative treatment. Notably among these was the erection of a new wall by which a portion of the public elevator hall of the



HALL AND PRIVATE OFFICE, LEHIGH PORTLAND CEMENT COMPANY, NEW YORK CITY

CALLINGHAM-LLOYD, INC., ARCHITECTURAL DECORATORS



RECEPTION ROOM AND OFFICE OF PRESIDENT, THE POSTUM COMPANY, NEW YORK CITY
CHARLES M. HART, ARCHITECT



RECEPTION ROOM IN THE OFFICES OF THE CRAFTEX COMPANY, NEW YORK CITY
MATERIAL MANUFACTURED BY THE COMPANY IS USED FOR WALL, CEILING AND ORNAMENT IN RELIEF

building was converted into the company's private hallway. Then, in the reception room, an awkward pier was concealed by erecting the wall flush with its outer surface, creating a deep reveal in which the door to the hall is hung, which even adds interest to the scheme, as can be seen in one of the illustrations. The space thus lost to the room has been made good use of by the installation of a cedar clothes closet, a lavatory and a telephone booth, each opening from secret doors built into the wood panelling. It will also be seen in one of the illustrations how the large, uninteresting windows of the building, so out of scale and inappropriate otherwise to the design of the room, have been treated and made unobjectionable, and how the existing beams, by the addition of others, all decorated, have actually become a part of the architectural scheme.

The reception room in the offices of the Craftex Company is interesting, too, as an illustration of the idea of demonstrating the use of the product which the concern manufactures. By the treatment of the walls and ceiling, in color and texture, interest is even centered in the opportunities which the product presents. And, in the application of an ornamental motive in relief and color, serving as a dado to the walls and a trim to the door openings, further possibilities of the material are demonstrated while giving peculiar interest to the architectural scheme by accentuating its lines and proportions.

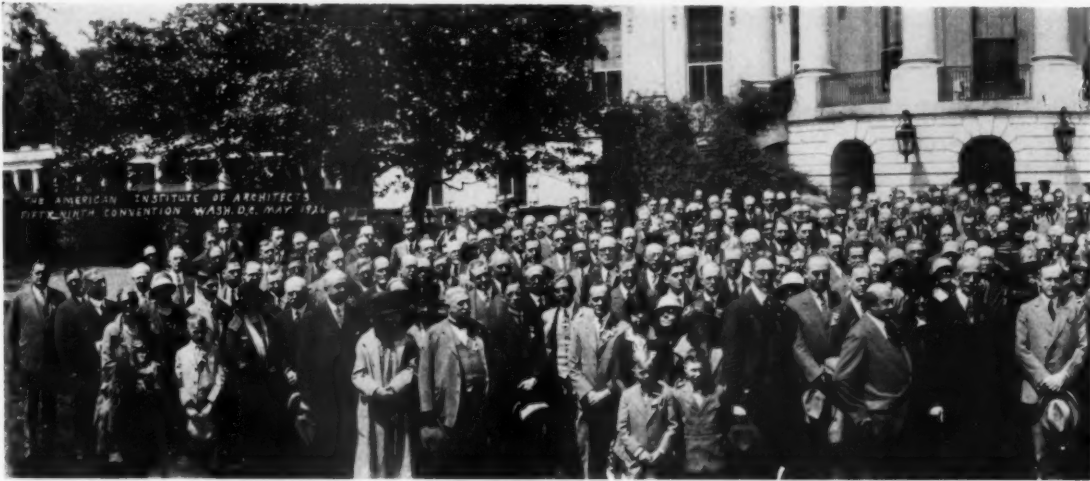


THE LOBBY OF THE BOARD ROOM PANELLED IN PINE



THE BOARD ROOM IN THE OFFICES OF THE POSTUM COMPANY, NEW YORK CITY

CHARLES M. HART, ARCHITECT



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RECEPTION BY
PRESIDENT COOLIDGE
TO THE
DELEGATES
AND
VISITING MEMBERS

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HIS panoramic photograph was made on the lawn of the White House with the south portico for a background. As the photograph was too large to admit of reduction to page size without cutting, it has been reproduced by including in each section the central figures of President Coolidge and President Waid of the Institute.

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FIFTY-NINTH
ANNUAL CONVENTION
OF THE
AMERICAN INSTITUTE
OF ARCHITECTS
MAY 6, 1926

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CHOIR LOOKING WEST, WASHINGTON CATHEDRAL, MOUNT ST. ALBAN, WASHINGTON, D. C.

FROHMAN, ROBB & LITTLE, ARCHITECTS
(From a drawing by the architects)



ELECTRIC POWER FOR BUILDINGS

By E. B. DAWSON

General Engineer, Westinghouse Electric & Manufacturing Company

THE purpose of this article is to outline the sources of electric power available, the characteristics of the various systems which may be selected, the power requirements of the various loads, the characteristics of the load in several types of buildings and to place in the hands of those responsible for the selection of the electrical apparatus reliable performance and cost data.

Purchased: Electric power may be purchased or generated. If purchased, either AC or DC power, and sometimes both will be available. As a rule, the AC power in North America will be 60-cycle, 3-phase, 110, 220, 440, 2,200 volts, depending on the class of service. One hundred and ten volts is practically always available for lighting; 220, 440 and sometimes 550 volts for comparatively small blocks of power; 2,200 volts or higher, stepped down through transformers in the building, for large blocks of power and light.

Most of the power systems in North America are 60-cycle. There is a large 25-cycle district around Niagara Falls on both sides of the St. Lawrence including Buffalo, N. Y.; Syracuse, N. Y., and Toronto, Canada; and also in and around Duluth, Minn.; Milwaukee, Wis.; St. Louis, Mo.; Baltimore, Md.; Keokuk, Iowa.

There is a 30-cycle district in Northern Michigan, including the cities of Grand Rapids and Kalamazoo. There is a 40-cycle district around Columbia, S. C. There is a large 50-cycle district around Los Angeles, Calif.

Except in the Niagara and Los Angeles districts 60-cycle power is usually available in addition to the other frequencies, and in some places 60 cycles is predominating, the other frequency being relatively unimportant.

Large stocks of 60-cycle apparatus are carried by the electrical manufacturer to facilitate shipments. A considerable stock of 25-cycle and 50-cycle apparatus is also carried. Sometimes 60-cycle apparatus can be operated satisfactorily on 50 cycles. Standard frequencies may be considered as 60, 50 and 25 cycles. Special apparatus is required for 40-cycle systems, although some 40-cycle equipment is carried in stock. It is the practice to use standard 25-cycle apparatus on 30-cycle systems and standard 60-cycle apparatus on 66 2/3-

cycle systems which are encountered occasionally.

Power companies are tending more and more to AC power, some even discontinuing the DC power supplied in the past. There are still many power companies which supply DC power, although some refuse to accept any new DC loads and some are contemplating discontinuing the DC power now being supplied. Usually DC power, when available at all, can be obtained only in the center of large cities.

Generated: Either DC or AC power may be generated in a building. As a rule, where it is considered economical to generate, DC power is generated, due to its greater flexibility when controlling motors. With variable voltage elevator equipment developed to its present stage of perfection, the flexible DC power is really required only where a considerable number of adjustable speed fan motors are needed.

A careful study of all conditions is required in order to determine whether to purchase or generate power where a large building, using a considerable amount of low pressure steam and power, is concerned. There are four systems which may be used:

1. Purchase power and generate low pressure steam for heating
2. Purchase power and central station steam
3. Generate high pressure steam for power and heat with exhaust steam
4. Generate power up to point where all the exhaust steam can be utilized and purchase the remainder of the power required

Among the points to be considered before deciding which system to use are:

1. Number and salary of engineers, firemen, oilers, electricians, miscellaneous helpers and coal passers
2. Cost of coal, water; ash removal
3. Cost of engine-room and boiler-room supplies
4. Cost of machinery repair or depreciation
5. Interest and other fixed charges on additional investment for generating equipment, including boilers and additional space
6. Earnings on sum spent for generating equipment if otherwise invested

7. Possibility of obtaining breakdown service from the central station
8. Possibility of substituting central station for generated power in the future

Selection of Power System: Where AC power is purchased, the frequency, number of phase and voltage is limited to that supplied by the central station. If there is any choice of frequency, 60 cycles should be selected because 60-cycle apparatus is standardized and more readily available than apparatus of other frequencies. Two-phase power may in some cases be easier to distribute for lighting, without unbalancing the system, than three-phase power. Its occasional advantages, however, probably never make it worth considering in view of the cost of the transformer required to obtain two-phase power from three-phase, and the greater availability of three-phase equipment. While the central station power is distributed at standard voltages, other voltages can readily be obtained by the use of transformers.

In general, 110-volt single phase lighting service is standard with power companies, but 220-volt single phase lighting service can be obtained if the feeder drop is too great with 110 volts, and the installation of heavier copper not economical.

Polyphase 220-volt power for motors will be satisfactory in most buildings. If required because of high voltage drop in feeders, 440 volts can be obtained. However, 220 volts is preferable because it is less dangerous to workmen.

Sometimes it will be more economical to purchase power at 2,200 volts or higher, and purchase and install a transformer substation, than to purchase power at the required voltage.

When AC power is generated it would appear that the most generally used system, namely, three-phase, 60-cycle should be selected, if for no other reason, because the electrical manufacturers carry very complete stocks of three-phase, 60-cycle equipment. However, where the central station power is not three-phase, 60-cycle, it may be desirable to install the same system as the central station. For instance, in a large 50-cycle district the more generally used 50-cycle apparatus, such as standard motors, can be as readily obtained as 60-cycle apparatus. Further consideration, favoring the use of the same system as the central station, are the possibility of obtaining breakdown service and the possible substitution of central station for generated power in the future. On the other hand, 25-cycle is not entirely suitable for modern metallic filament incandescent lamps. It will usually be economical to generate at the voltage used for motors, 220 or 440, and step down through transformers for the 110-volt lighting circuits. In cases where large blocks of power or light are used at a considerable distance from the generating station it may be economical to generate at 2,200 volts and step down at the point the power is used to the motors

and light voltages in order to save transmission losses and feeder copper.

DC power is supplied by central stations at 115, 230 and 550 volts. The standard lighting voltage is 115 volts and the power voltage 230 volts. The 550-volt power when available is usually supplied from the street car power system and is apt to fluctuate. AC power is generally available where 550 DC power is available.

DC power when generated in the building is practically always generated to supply 230 volts for power and 115 volts for lights obtained from three-wire generators or from rotary balancer sets. This voltage combination is usually fixed when, as is usually the case, 115 volts is required for lights, 230 volts being the only other voltages that can be conveniently obtained from the one system. The generators are wound for 250 volts, the fields being adjusted to maintain 230 volts at the motors. As 230 volts is entirely suitable for the power load, being sufficiently high so that the line drop need not be excessive, permits a conservative motor and generator design and is not sufficiently high to be really dangerous to workmen, it is safe to state that 250-125-volt power (230-115 volts at the load) is standard for small DC power plants handling both light and power loads.

Assuming the generation of 230 volts DC power, 115 volts can be obtained for the lights in three ways: 1. Rotary balancer sets. 2. Three-wire generators. 3. A 230- to 115-volt motor generator set. Balancer sets can be installed on any two-wire DC system and a neutral voltage obtained. The rating of the balancer sets depends on the unbalanced current (current in the neutral wire), the current in the neutral splits half passing through each of the machines of the balancer set. If on a 3,000 KW, 250-volt station (12,000 amp.), a 10% unbalance is provided for, 1,200 amps. will flow in the neutral (10% of full-load rating of each outside line). Under these conditions 600 amp. will flow in each of the 125-volt machines of the balancer set. Therefore the balancer set will be composed of two 75 KW machines, and the balancer set would be spoken of as a 150 KW set. The wiring for balancer sets is simpler and less expensive than the wiring for several three-wire generators operating in parallel, mainly because the series field of compound-wound three-wire generators have to be split and two equalizer leads used, and because there are usually fewer balancer sets required than there are generators, provided the per cent unbalance is not too great. In general three-wire machines will be found less expensive, installed, than two-wire machines and balancers, when the per cent unbalance is large, around 25%, and the number of balancer sets required approaches the number of generators. As a rule, three-wire machines will be used in small plants where the unbalance is apt to be considerable and the number of generators small, and two-wire machines and balancers in large plants

having a number of generators and probably a comparatively small unbalanced load.

Where the amount of 115-volt power required is small compared to the 230-volt power used and is concentrated in one locality, a separate 250- to 125-volt motor generator set can be used to supply this load. This condition is seldom encountered in buildings, as the lighting load at 115-volts is usually the largest proportion of the total power.

Even where the load is practically all lights it is cheaper to use 230-volt three-wire generators or balancers than to generate at 115 volts, because the 230-volt generators are cheaper than the 115-volt and the distribution copper is less.

Lighting Load: The lighting load in a building is usually the largest part of the total load. The main requisite is that the power supply shall be such that the lights will not flicker because of the characteristics of the voltage wave, nor grow dim due to the effects of loads on the system.

Lights will flicker, if supplied by a low frequency AC system, or by DC generators which, due to the design, have a sufficiently large ripple in the voltage wave. There is a noticeable flicker in incandescent lights supplied from 25-cycle systems. At 30 cycles few people will notice the flicker.

The addition of a load to a system causes a drop in voltage for the fraction of a second required for the load current to build up. This dip in the voltage wave will be shown by an oscillograph and will occur in spite of the compounding of generators or the action of regulators. If the instantaneous drop in voltage is more than 5%, some people will notice the dimming of the lights, and if more than 10%, the dimming will be quite noticeable, especially if it occurs frequently. The drop in voltage in per cent will be the same as the instantaneous load in per cent of the load already on the system, theoretically approaching zero volts when load is applied to a machine operating at no load. If the load varies with considerable frequency the alternate dimming and brightening of the lights may amount to a flicker. The drop in voltage probably will not show in the lights if the largest load that can be applied at one time does not exceed 10% of the load already on the system or feeder. This figure may be greater than 10% as the average motor load is controlled, so it takes several seconds to build up, whereas after the application of an instantaneous load the voltage returns to its normal value in about one-fourth second or less.

The installed lighting load varies over wide limits, probably varying from 1 to 2 watts per square feet of rentable area in office buildings and from 300 to 700 watts per room in a hotel. Electric signs, or flood-lighting, may increase these figures.

Ventilating Load: The ventilating load varies from a comparatively small amount in some office buildings to a large proportion of the total load in hotels, large schools, auditoriums, large department stores, etc. This is quite a steady load and can be carried by practically any system. On AC systems the power factor may be low if the fans are overmotored or if driven by low speed direct connected motors. If this low power factor load is not compensated for by other high power factor loads, the low power factor should be taken into consideration when selecting the source of power, particularly when generating AC power and allowance made in the generators for the low pressure factor.

The power required for ventilating various types of buildings depends to a large extent on conditions

peculiar to the building under consideration. The following data will serve to give an idea of power requirements before making a careful analysis:

Office Buildings—Installed HP for ventilation per sq. ft. rentable area .00024 to .00032

Hotels—Installed HP for ventilation per room .2 to .32

Large High Schools with Auditorium, Pool, etc.—Installed

HP for ventilation per pupil .007 to .01

Large Graded Schools with Auditorium, Pool, etc.—Installed HP for ventilation for pupil .004 to .008

Smaller Graded Schools without Auditorium—Installed HP for ventilation per pupil .002 to .006

Clubs, Y.M.C.A., etc.—Installed HP for ventilation per cu. ft. gross volume .000022 to .000095

Pump and Compressor Load: The pump and compressor load, particularly in a hotel, is a considerable portion of the total load. It ranges from .0002 to .000055 HP per square foot of rentable area for office buildings, the lower limit applying to buildings where power is generated and some steam pumps used, and up to .5 HP or more per room for hotels. There is often an opportunity to use synchronous motors for compressor drive, thus improving the system power factor.

Miscellaneous Load: Kitchens, laundries and machine shops require some power. The growing

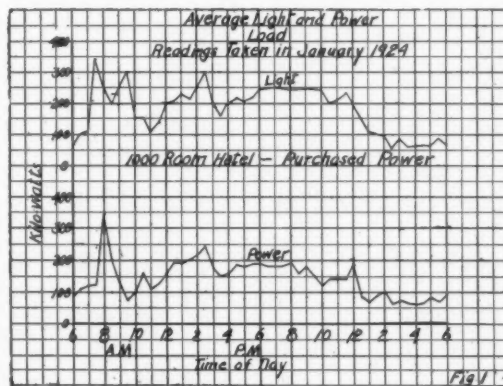


FIGURE 1

use of electric heat for cooking may make a considerable kitchen load.

Elevator Load: The elevator installed capacity will depend on the class of service desired. The ele-

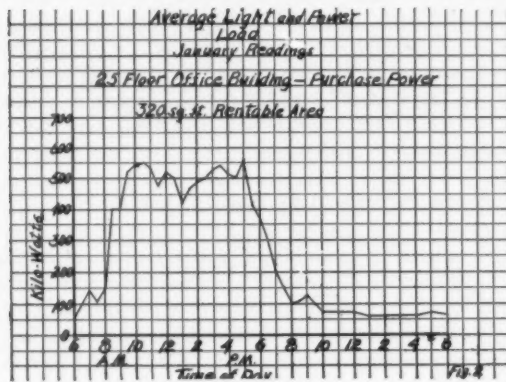


FIGURE 2

vator load may be supplied from any standard source of power either AC or DC.

In general, the available classes of elevators are:

- Gearless AC—Requires AC power
- Gearless DC—Requires DC power
- Gearless Variable Voltage—Either AC or DC power
- Gearless DC—Requires DC power
- Gearless Variable Voltage—Either AC or DC power

Where AC power is available, the elevators will be variable voltage, gearless or geared, or AC geared, as it is very doubtful if the installation of a motor generator set or synchronous converter, to supply DC power and permit the use of the resistor type DC elevators, is justified for this purpose alone. AC elevators will have a comparatively low average power factor when induction motors are used, and this should be taken into consideration when selecting transformers, generating equipment and feeders. The variable voltage elevators can be supplied with synchronous motors for power factor improvement where economical.

Where DC power is available any type of elevator, except the geared AC, may be used. The resistor type is frequently justified, when the first cost is a prime consideration, and the highest class of operation is not necessary. The variable voltage system for both geared and gearless equipments is growing in favor for the high class installation, even where DC power is available, because of the smooth riding quality, the accurate landings that can be made with comparative ease, and the permanent adjustment of the equipment. The installed elevator horsepower varies from .0012 HP to .0025 HP per sq. ft. of rentable area for office buildings, and from .3 to .5 HP per room for hotels.

Capacity of Substation or Generating Station: The capacity of a building substation or generating station is fixed by the installed load, the de-

mand factor, the maximum value and duration of peaks, the efficiency of the electrical equipment, and the power factor in the case of AC systems.

Load Factor: The load factor or ratio of average load to installed capacity varies with the type of building. The average load of a building during its operating period (about 10 hours a day for an office building) probably averages around 30% of the total connected load. From data at hand it appears that the load factor of large office buildings is around 25% and of hotels 35%. For lights alone the load factor for office buildings is around 40%.

The average of several office buildings indicates that the installed HP should be from .002 to .003 per sq. ft. of rentable area and the total power consumption, including lights, 5 to 8 KWH per year per sq. ft. of rentable area. The power consumption for lighting is from 50 to 75% of the total. Of the part used for power, the elevators consume from 50 to 75%. Figure 1 shows a typical load curve for a hotel. Figure 2 shows a typical load curve for an office building. Clubs and Y.M.C.A. buildings have load factors similar to a hotel. The load factor of department stores is similar to that of office buildings, but the day load starts a little later and lasts a little longer. The seasonal variation in the electric power consumed is small. For hotels the peak winter load during December and

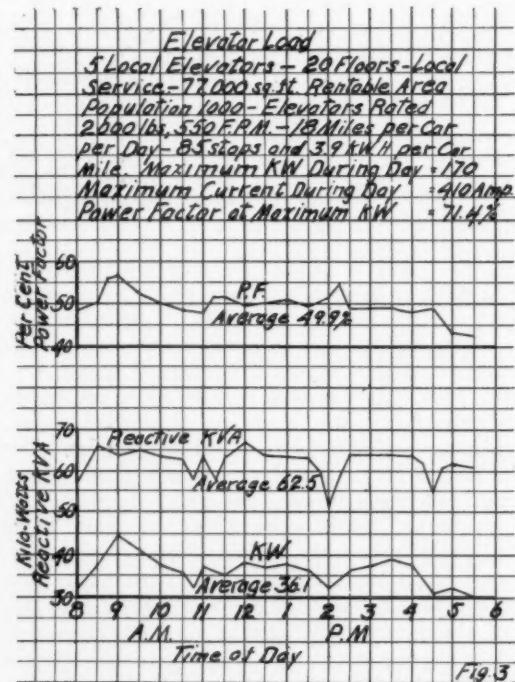


FIGURE 3

January will be around 116% of the average yearly load, and the minimum during July and August 83% of the yearly average. For office buildings these figures are 117% and 88% respectively.

Peak Load: The average value and duration of the peaks are shown in Figures 1 and 2. Momentary peaks are caused by the elevator load. Examples of the extent of these peaks for hotels and office buildings are shown in Figures 2, 3 and 4.

Number of Units: When power is purchased the central station will usually supply separate light and power feeders, and no substation will be required other than the metering and distribution panels. If power is purchased at say 2,200 volts and stepped down in the building for lights and power, two transformer banks should be used; one for light and one for power, if the dimming of lights due to starting motors is to be minimized. Three-phase banks of single phase transformers, if connected in delta, can in the case of failure of one transformer be operated in open delta, the capacity being 58% of the three delta connected transformers. Unless periods of light loads are very long, the losses of the large bank will not be large enough to justify the installation of a smaller bank to carry the light loads.

Generating stations, because of the poor efficiency at light loads, should have a small unit to carry the load during the night. There should be a sufficient number of units so that the load can be carried with one unit out of commission.

Power Factor Problems: The question of power

ous converters or motor generator sets. With the tendency toward the use of AC power for both lights and power in buildings, the power factor problem has to be considered.

The size of the prime mover, boiler plant, coal

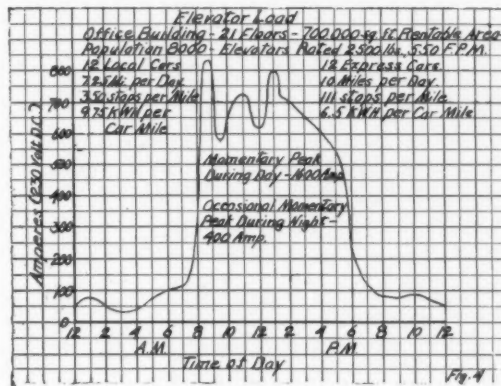


FIGURE 4

and ash building machinery and cost of fuel are determined by the power or kilowatts developed, while the size of the generators, transformers, distribution system, circuit breakers and induction feeders regulators is determined by the apparent power load or kilo-volt-amperes.

The saving in generating station capacity by raising the system power factor is illustrated by Figure 5, which diagrammatically shows how, by adding leading reactive KVA, to improve the power factor, the station earning capacity is increased 37%.

Power factor corrective apparatus includes all apparatus which operates at a power factor higher than the desired system power factor. Synchronous converters and 100% PF synchronous motors which operate at 100% PF at full load and return a leading reactive KVA to the line at lighter loads can be used to correct power factor. Synchronous motors are often designed to return a leading KVA to the line, even when operating at full load. Synchronous motors are often used on refrigerating machines, and can be used to advantage to drive other apparatus. Synchronous motors are particularly desirable, in preference to induction motors, if the average load on the motor is small in comparison to the motor rating. Static condensers have now been developed where they are very reliable and efficient and are often used to correct power factor being connected to either the low voltage or high voltage power lines.

Power Charges: Central Station power rates are set at values which will pay the fixed charges on the investments, the cost of generating power and the overhead and leave a profit. Obviously the fixed charges and some of the overhead have to be paid as long as the system is held in readiness to supply power, even though the customer actually use no power. It is also evident that the overhead, including metering, billing, etc., is larger per KWH for

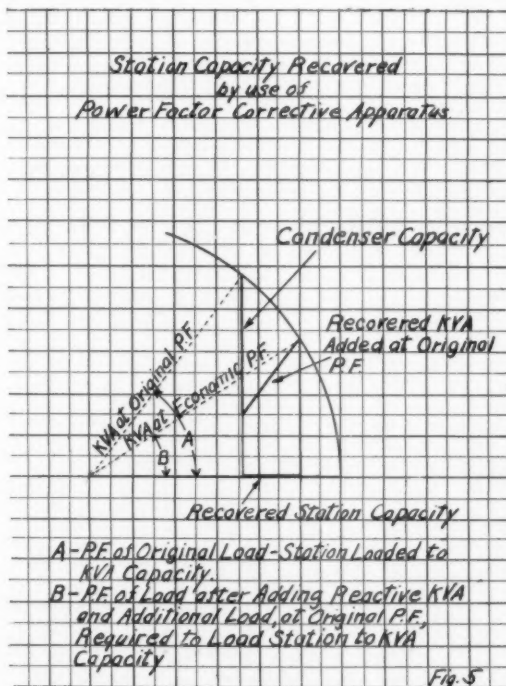


FIGURE 5

factor improvement has been studied extensively by the central stations, and by most industries using a considerable amount of power. Until comparatively recently most of the large buildings used DC power, either generated or converted by synchron-

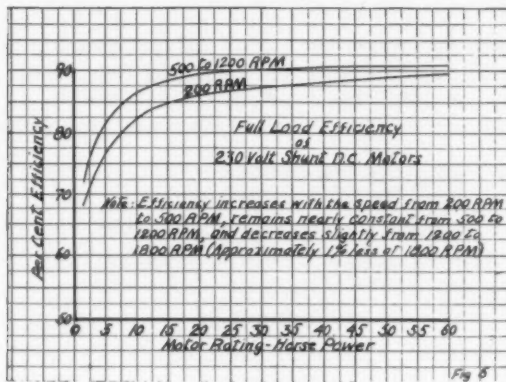


FIGURE 6

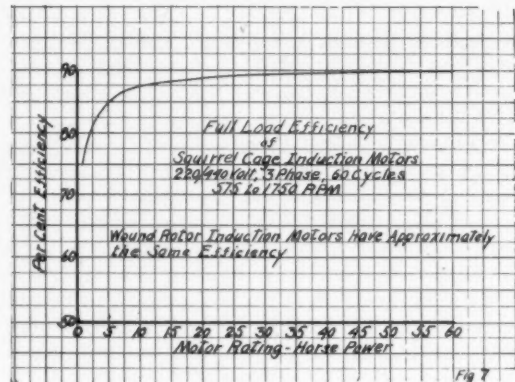


FIGURE 7

small loads than for large. The fixed charges per KWH are also larger for small loads than for large, due to the expensive distribution system required.

The result is that all customers pay a demand charge in some form or other which is based on the maximum system capacity that will be tied up by a customer. This demand charge may be based on a customer's total installed load or on the maximum demand for a set period of time.

In addition to the demand or service charge each customer will pay for the power actually used, the rate decreasing with the amount used. Usually there is a high rate for the first block of power, a lower rate for the second block of power, which is larger than the first, and a still lower rate for the third block. As a rule, there will be a power factor clause in the contract which will penalize the user if the power factor is below a set minimum and may provide a bonus if the power factor is above the minimum or some set maximum. In many cities the power factor clause, while in the contract, is not enforced.

Performance and Cost: Various problems in connection with the purchase or generation of power have been discussed. Before selecting the most suit-

able power system or deciding whether to purchase or generate power, the performance and cost of the several possible systems must be compared. The purpose of the following paragraphs is to place in the hands of those responsible for the selection of the electrical apparatus reliable performance and cost data for preliminary estimates.

The performance curves show average values. It is thought that curves showing average values will be of more use than tables showing the actual performance of each rating.

The cost curves, while plotted against dollars, are intended mainly to give comparative values. If the cost of one rating is known, cost of other ratings can be determined with accuracy from ratios obtained from the curve values. The actual dollar values given are approximate.

Motors: The performance and cost of shunt DC, squirrel cage, and wound rotor motors, such as used for driving pumps and fans, are shown in Figures 6, 7, 8, 9, 10, 11, 12 and 13. Figure 8 is intended for use in conjunction with Figures 6 and 7 for the purpose of determining the power consumption of the different types of adjustable speed motors when driving centrifugal fans and

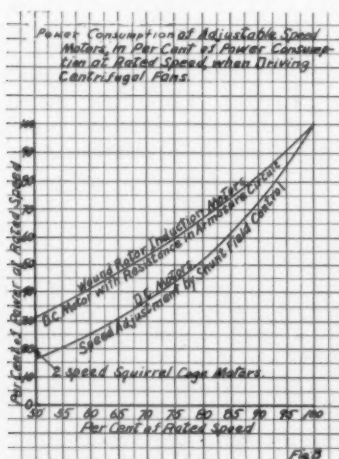


FIGURE 8

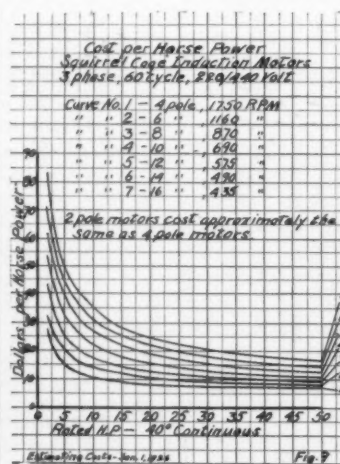


FIGURE 9

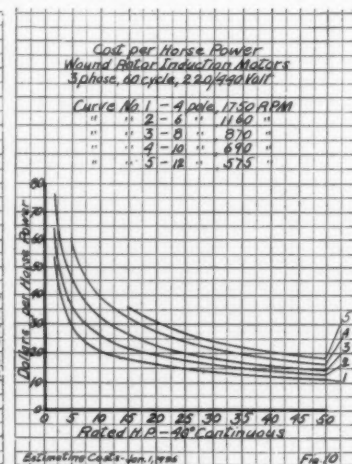


FIGURE 10

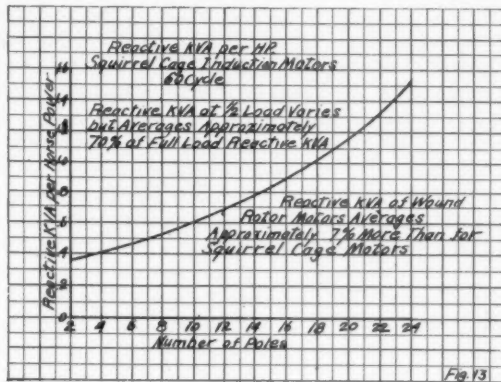


FIGURE 13

pumps at speeds below maximum. For example, consider a 20 HP, 1,200 RPM wound rotor motor and 20 HP, 200 RPM constant and adjustable speed DC motor. The following data will be obtained from the curves:

	DC		AC
	Shunt Field Control	Resistance in Armature Rotor	Wound Rotor
KW input at rated speed and full load	17.4	17.4	16.83
KW input at 66 2/3 per cent rated speed	5.65	8.5	8.25
Approximate cost of motors	\$1,720	\$1,400	\$390

An inspection of Figure 7 shows that since the curves for DC motors with shunt field control and DC motors with speed control by armature resistance are practically parallel from about the 70% speed point down, it is not economical to purchase expensive DC motors with 50% reduction by field control. It is better, rather, to purchase standard DC motors good for speed reduction down to 66 2/3% of full speed and secure further reduction in speed if needed by means of armature resistance. As a matter of fact, it is questionable whether it

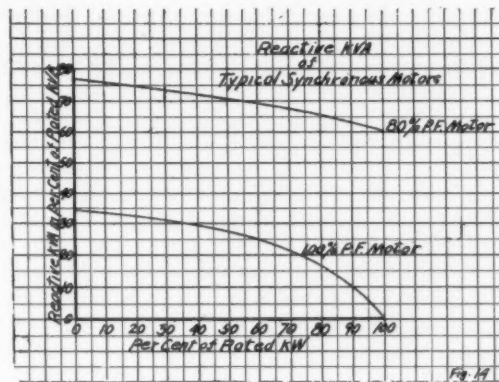


FIGURE 14

would not be most economical to purchase constant speed motors, all of which are good for 25% increase in speed by shunt field control. If this were done in the above example a 160 RPM constant speed motor, good for 200 RPM, 20 HP maximum, would have been used, costing approximately \$1,600. Using armature resistance below 80% speed (moving the upper curve down parallel to itself until it crosses the lower curve at the 80% speed point) the power consumption would be 5.95 KW at 66 2/3% of maximum speed.

The power factor of induction motors can be calculated from Figure 13. For example, a 10 HP 8-pole squirrel cage motor will have from Figure 7 an efficiency of 87.3% and from Figure 13 a reactive KVA of 5.3. The power factor will be 85%. When comparing motors from the power factor standpoint, the efficiency should be taken into account, as in the above example, rather than only comparing power factors. For instance, if the motor in the above example had an efficiency of 80% with the same reactive KVA the power factor would be 87% but the losses would be .78 KW more. The additional energy charges would more than overbalance a slightly better power factor.

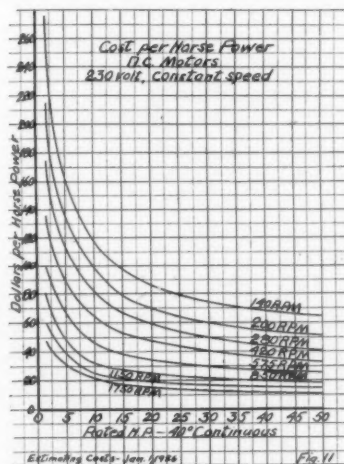


FIGURE 11

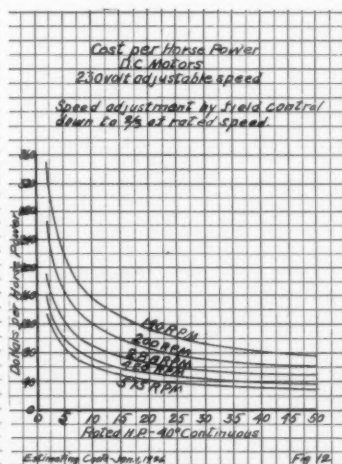


FIGURE 12

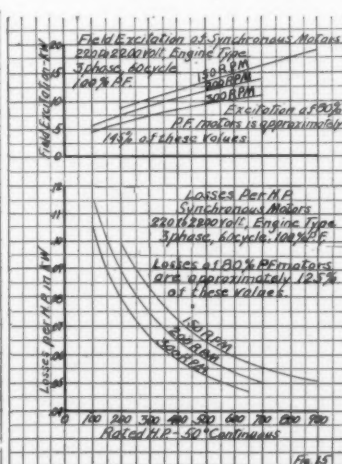


FIGURE 15

The performance and cost of synchronous motors are shown in Figures 14, 15 and 16. The losses shown in Figure 15 include the field excitation. For convenience in estimating the size of exciters the field excitation is also given. From Figures 14 and 15 the reactive KVA available for corrective power factor can be calculated. For example, a 300 HP 100% PF motor, 200 RPM, has (Figure 15) an input of 246 KVA at full load. If the average load is 150 HP the average reactive KVA (Figure 14) will be 66 KVA. If an 80% PF motor is used the input will be 314 KVA and the reactive KVA 220 at 150 HP. The cost of the additional reactive KVA obtained from the 80% PF motor can be determined by capitalizing the additional losses of 5.5 KW and the additional cost of approximately \$500.

Substation Apparatus: The cost and performance of substation apparatus are given in Figures 17, 18, 19, 20 and in the following paragraphs.

Static condensers, while not necessarily substation apparatus, are for convenience grouped with substation apparatus. The cost of static condensers is shown in Figure 17. Static condenser losses are practically constant at not more than .5% of the rated KVA capacity. If transformers are used in connection with condensers to operate, say, from 220 volts and minimize the first cost the transformer losses must be considered.

Transformers are very efficient, and while the losses per KVA vary with the size, it is sufficient for estimating purposes to assume an efficiency at full load of 98% and assume that at full load the constant losses average 1/3 the total losses. With this data the losses at any load can be calculated as the variable losses vary as the square of the load.

A brief examination of the cost and performance of transformers compared to any converting equipment will show that where AC power is purchased it should be used as AC rather than converting to DC. For example, consider an office building

with a peak load of 500 KW. If all power were converted to DC, say, by two 300 KW and one 100 KW converters the cost of the converters (Figure 18) with the necessary transformers would be \$20,300 without considering the installation cost. Assuming an average load of 350 KW from 8:00 A.M. to 7:00 P.M. and an average load of 75 KW from 7:00 P.M. to 8:00 A.M. the losses would be (Figure 20) approximately 44 KW during the day and 9.3 KW during the night, a total of 605 KWH for the 24 hours. A transformer substation, on the other hand, consisting of three 200 KVA single phase oil insulated units connected delta-delta would cost (Figure 19) \$2,829 and the losses, assuming 80% average power factor and the same KW load as used in the case of the converters, would be 8.4 KW during the day and 4.3 KW during the night, or a total of 148 KWH for the 24 hours. The conversion losses would be still greater if the motor generator sets were used.

If for the same office building the use of AC power is assumed for lights, but conversion units are being considered to obtain DC for the power load, which is calculated to average 100 KW during the day with momentary peaks of 250 KW and 15 KW during the night with momentary peaks of 60 KW, there would be required one 200 KW converter and one 100 KW converter costing (Figure 18) \$11,000 with losses (Figure 20) or 14.2 KW during the day and 6.4 KW during the night, or a total of 239 KWH for the 24 hours. Assuming an average power factor of only 50% and the same power three 100 KVA single phase transformers needed for the power load would cost (Figure 19) \$1,750 and have losses of 3.9 KW during the day and 2.2 KW during the night, or a total of 72 KWH for the 24 hours. If AC were used direct there would be a saving of \$7,950 in first cost of the substation apparatus and 156 KWH in substation losses per 24 hours, which can be applied, for instance, to the more expensive

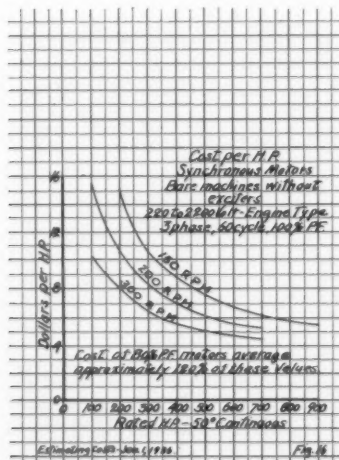


FIGURE 16

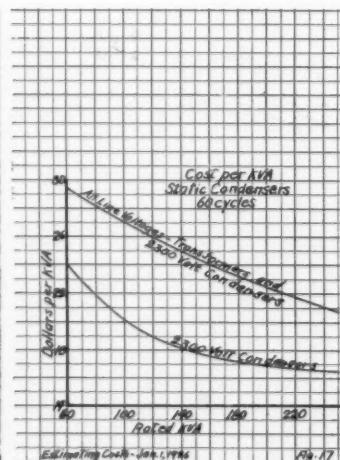


FIGURE 17

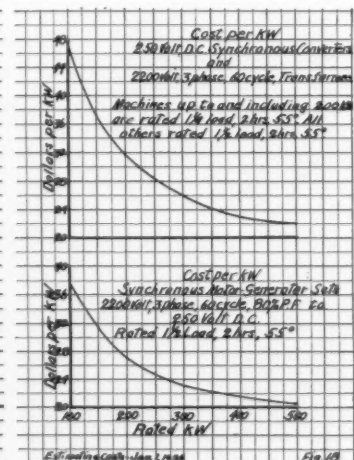


FIGURE 18

gearless variable voltage elevator equipment or the less efficient geared AC elevators.

In some building the convenience of DC power for adjustable speed equipment, such as fans, and the good performance of adjustable speed DC motors at low speed may justify the installation of conversion equipment. Where this is true there is a choice between converters and motor generator sets. For convenience we will assume that it is decided to use DC for the power load in the office building used in the above example.

Motor generator sets of the same rating would cost (Figure 18) \$8,910, and having losses (Figure 20) of 28 KW during the day and 11.5 KW during the night, or a total of 458 KWH for 24 hours. The motor generators would cost \$2,090 less than the converters assuming AC power purchased at a voltage suitable for the motor of the motor generator sets, so that no transformers would be required for the sets. The losses of the motor generator sets would be 219 KWH per day more than the converter and transformer losses which if worth two cents per KWH and capitalized at 10% would amount to \$13,150, based on 300 days.

Generating Apparatus: Where it has been considered economical to generate power, DC has as a rule been selected, probably because of its convenience in controlling the rheostatic type elevators and the desirability of using low speed direct connected constant or adjustable speed motors for driving fans. Most of the large buildings generating power are in the DC districts of large cities, so the ease of change over to central station power at a later date and the possibility of securing breakdown service doubtless had a bearing on the selection of DC. The cost and performance of engine type generators are shown in Figures 21, 22 and 23. AC generators are sometimes used particularly where the lighting load is a very large proportion of the total, but the writer knows of no large buildings requiring large amounts of power for driving motors where AC

power is generated. It will be interesting to compare the cost of electrical apparatus in a building, assuming in one case DC power is generated and in the other case AC.

Assume a 1,000-room hotel with a load curve similar to that shown in Figure 1. Three 250 KW generators would be sufficient to handle the load. We will assume that the 250 KW generators run at 200 RPM. We will assume that the DC machines are rated $1\frac{1}{4}$ load, 2 hours, 50°C and that the AC machine are rated 400 KVA, 80% PF 50°C continuous so that they will carry the same power load as the DC machines. The cost of the DC generators would be (Figure 21) \$17,650 and the cost of the AC generators \$11,050.

Belted or direct connected exciters and an automatic voltage regulator would be required by the AC machines. We will assume that the cost of the exciters and regulator will be offset by the balancer sets or three-wire parts required with the DC generators. AC power would probably be generated at 220 volts and the power required for lights transformed to 110 volts. Three 100 KVA single phase transformers would be required for the lighting load and would cost \$1,740 plus the cost of a vault for them.

There would be in the hotel in the vicinity of 20 motors driving fans averaging about $12\frac{1}{2}$ HP. If DC power were used these motors would average about 300 RPM, costing, if adjustable speed (Figure 12), \$19,300. There would be about 25 motors driving pumps and compressors averaging about 22 HP at 850 RPM and costing (Figure 11), if DC constant speed, \$13,700. In addition there would be about 20 motors in the kitchen and for other miscellaneous purposes, averaging about 2 HP at 1,750 RPM and costing if constant speed DC (Figure 11) \$1,800.

If AC power were generated the fans would doubtless be driven by belted varying speed wound rotor motors averaging $12\frac{1}{2}$ HP at 1,200 RPM

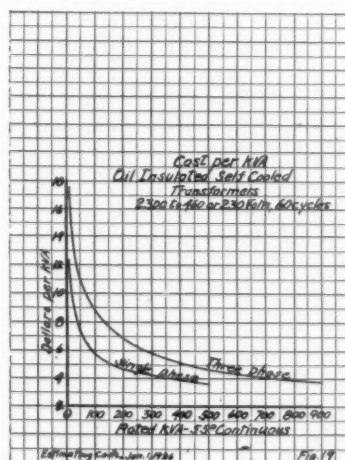


FIGURE 19

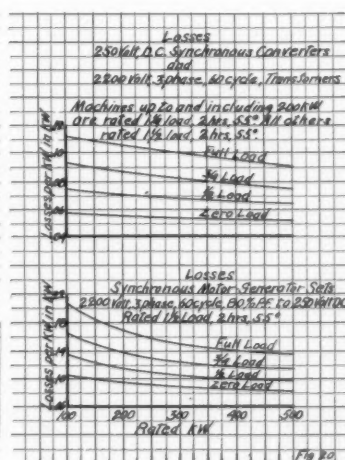


FIGURE 20

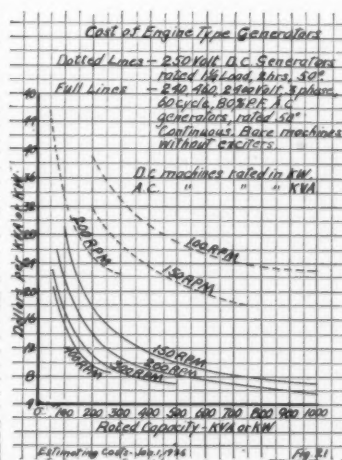


FIGURE 21

and costing, exclusive of belts and pulleys (Figure 10), \$5,750. The pump and compressor motors would be part wound rotor and part squirrel cage. Assume that they are evenly divided and rated the same as the DC motors, they would cost (Fig-

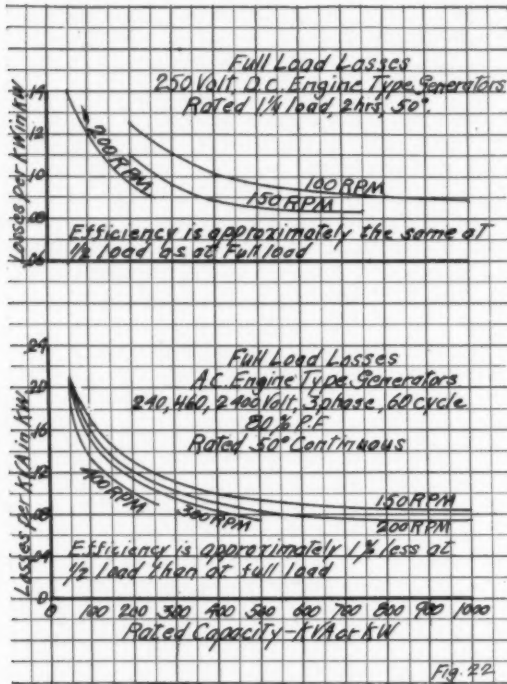


FIGURE 22

ures 9 and 10) \$9,340. The miscellaneous squirrel cage motors if rated the same as the DC would cost (Figure 9) \$1,100.

	DC	AC
Generators	\$17,650	\$11,050
Transformers		1,740
Ventilating motors	19,300	5,750
Pump and compressor motors	13,700	9,340
Miscellaneous motors	1,800	1,100

Total \$52,450 \$28,980

To offset this difference of \$23,470 in first cost, the elevator equipment, assuming ten elevators and the variable voltage gearless elevators in both cases, would cost about \$1,000 less if DC power were generated, thus leaving a net saving in first cost of \$22,470 in favor of AC.

If the cheapest DC equipment were used, the ventilating motors could be belted the same as the AC and could be constant speed with speed control by armature resistance at a cost for motors, exclusive of belts and pulleys (Figure 11), of \$5,700, or \$13,600 less than if direct connected adjustable speed motors were used. If rheostatic elevators were used instead of variable voltage, the saving in favor of DC rheostatic control would be around \$15,000

for the ten elevators. If the cheapest ventilating motors and cheapest elevators are used the DC system would be \$15,000 + \$13,600 — \$23,470, or \$5,130 less than the AC system.

This analysis indicates that the highest class ventilating and elevator equipment could be used if DC power were generated. A saving of \$22,470 in first cost could be made if AC power were generated and sacrifices made in the grade of ventilating equipment still maintaining the high grade elevators.

Whether DC or AC power is generated, the turbo generators, either geared or direct connected, deserve consideration due to their low first cost and small space requirements. For instance, in the above example three 250 KW geared DC turbines would cost only \$31,100 (Figure 24), which is only \$13,450 more than the cost of engine type DC generators alone. Small turbines are not as efficient (Figure 25) as some small engines, especially when operating non-condensing, but where the exhaust steam is used for heating and the heat balance properly worked out the difference in water rates may not be important. Turbines are not as quiet as engines, but this fact would not prohibit their use in buildings under favorable conditions.

As an example of the use of Figure 25, consider a 500 KW turbine operating at 70% full load, 150 lbs. steam pressure and 2 lbs. back pressure, the machine to be rated 50° continuous, which is the standard rating of Westinghouse AC geared turbo generators. The water rates, per brake HP at 5 lbs. back pressure obtained from the lower curve, is 29 1/2 lbs. From the upper curve marked % water rate against back pressure, you will find that the water rate at 2 lbs. back pressure is 94% of the rate at 5 lbs. back pressure, which multiplied by 29.5 gives 27.7 lbs. for the machine under consideration when operating at full load. Referring to the upper curve,

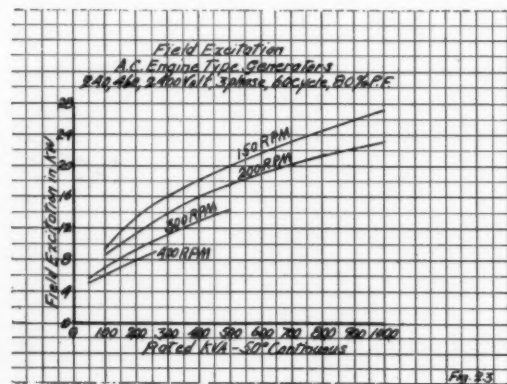


FIGURE 23

the water rate at 70% load will be 118% of the full load water rate, or 32.7 lbs. per brake HP when using both nozzles. If only one nozzle is used, the water rate at 70% load will be 99% of the full load water rate, or 27.4 lbs.

The water rate of DC geared turbines, which are rated $1\frac{1}{4}$ load 2 hr. 55° , will average 106% of the above values.

Rating of Electrical Apparatus: Electrical manufacturers are continually standardizing ratings so as to eliminate the confusion of a number of ratings for the same apparatus. For example, practically all manufacturers in the United States rate their general purpose motors both AC and DC on a 40°C continuous basis, that is, the temperature rise will not exceed 40°C when operated at full load continuously. Practically all transformers are rated on a 55°C continuous basis. The insulation in the apparatus furnished by reliable manufacturers for use in buildings, will stand a maximum temperature of 105°C without deterioration. For apparatus such as motors or generators the rules of the American Institute of Electrical Engineers require that where the temperature is measured by the thermometer 15°C shall be allowed as the drop in temperature between the hottest part and the thermometer. Thus the maximum observable temperature is 90°C . It is assumed that air cooled machines may operate in places where the air temperature may be as high as 40°C . The general purpose motor operating in an air temperature of 40°C (104°F) may rise 50°C (90°F) before reaching the maximum observable temperature of 90°C (194°F). The standard 40°C general purpose motors have a margin of 10°C rise before reaching the temperature for which the insulation is designed.

Where the air temperature is lower than 40°C electrical apparatus may be operated at a higher load as far as the temperature is concerned, but it must be borne in mind that the temperature gradient from the inside of the coils to the outside increases as the losses increase and that the mechanical parts are designed only for the rated load. As

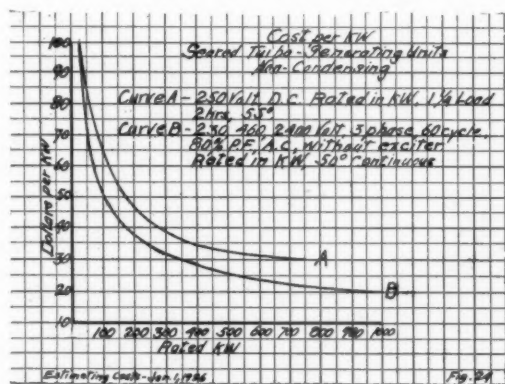


FIGURE 24

a general rule, it is not safe to operate machines at a higher temperature rise than guaranteed by the manufacturer regardless of the air temperature.

In the case of oil-insulated air-cooled transformers, a temperature rise of 55°C measured by ther-

mometer on the transformer windings is permitted. Again 40°C is the assumed air temperature. Since the oil is an insulating as well as a cooling medium, it is in very close contact with the active material, so the 10°C allowance between the maximum ob-

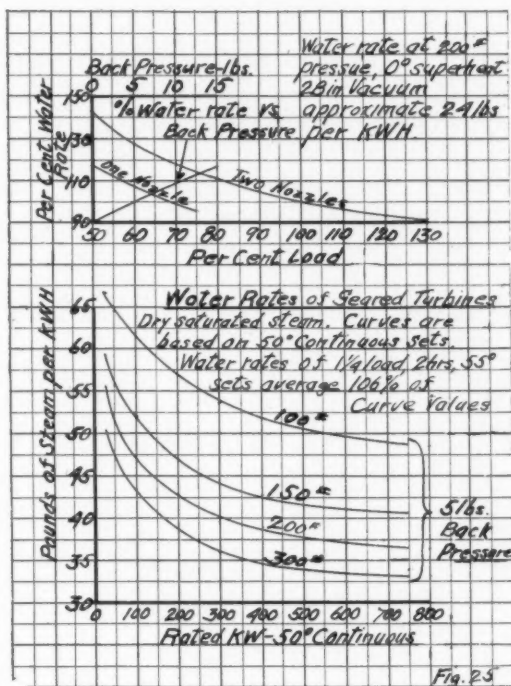


FIGURE 25

servable temperature (95°C) and the maximum insulation temperature (105°C) is sufficient.

AC generators and synchronous motors as a rule are rated 50°C continuous. These machines are usually more closely applied and have better care and inspection than the general purpose motors. These machines are worked to the limit of the insulation, an observable temperature of 90°C .

DC generators and synchronous converters usually are rated 125% or 150% load for two hours with 50°C or 55°C rise. These machines are used to a large extent to supply loads such as street railways and loads in the DC districts of cities which are subject to peaks of two hours or less, and the machines are rated accordingly. It is common practice to permit a 10°C higher rise on commutators than on other parts of the machine. As the commutators are made of copper and mica a 10°C rise is within the limits of the material.

Many special ratings are used for special applications. For instance, elevator motors may be rated one hour, 50°C rise.

The industry is gradually standardizing ratings through the agency of the Electric Power Club. When comparing price and performance, the machines being compared should all be rated on the same basis. As an aid in comparing machines and

ratings Figures 26 and 27 have been prepared. Figure 26 shows time temperature curves of oil-insulated self-cooled transformers at various loads. Due to the large volume of oil a constant temperature is not reached for a number of hours. The short

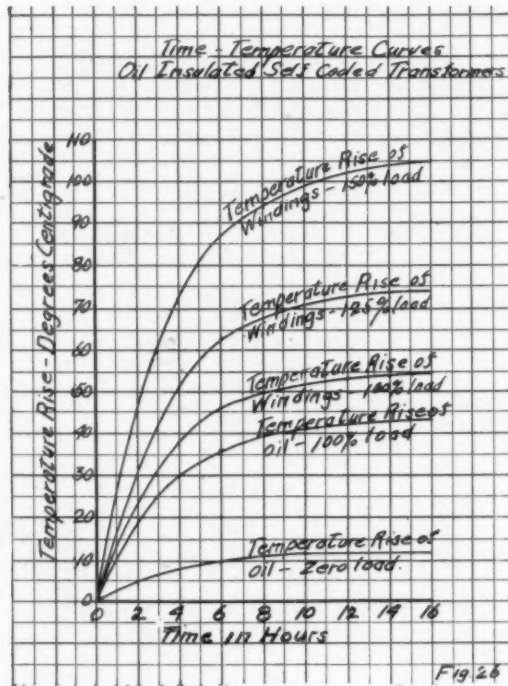


FIGURE 26

time overload capacity is correspondingly great. For example, a 300 KVA bank of transformers would carry 375 KVA, starting cold, for four hours without difficulty. It will be noted that the temperature rise varies roughly as the square of the load. A 300 KVA bank with a root mean square load of 225 KVA would have an average temperature rise of from 30 to 35°C and would carry peaks of 375 KVA for two or three hours without danger.

Figure 27 shows typical time temperature curves, at various loads, of rotating machines. A constant temperature is reached in much less time than in the case of a transformer. There is practically no increase in temperature after a two-hour run. A machine rated 150% load, 2 hr., 55°C, is a larger machine than one rated 40°C continuous. A machine rated 150% load, 2 hr., 55°C, after reaching constant temperature at full load will carry 150% load for two hours without exceeding 55°C rise. From estimates based on the curves it appears that machines rated 40°C continuous are about the same size as machines rated 1 1/4 load, 2 hr., 50°C.

Efficiency: Two efficiencies are recognized by the American Institute of Electrical Engineers' standards, conventional efficiency and directly measured efficiency. Unless otherwise stated, it is the practice

of manufacturers to use the conventional efficiency because it can be determined more accurately than the measured efficiency.

In the conventional efficiency of rotating machines, allowance is made for the losses shown in the following table:

CLASSIFICATION OF LOSSES IN ELECTRICAL MACHINES

Accurately Measurable	Approximately Measurable or Determinable	Indeterminable
No load core loss including eddy current losses in conductors at no-load.	Brush friction loss.	Iron loss due to flux distortion.
Load I ² R losses in Windings.	Brush contact loss.	Eddy-current losses in conductors due to transverse fluxes occasioned by the load current.
No-Load I ² R losses in Windings.	Losses due to windage and to bearing friction.	Eddy-current losses in conductors due to tooth saturation resulting from distortion of the main flux.
	Dielectric losses.	Tooth-frequency losses due to flux distortion under load.
		Short-circuit loss of commutation.

In the conventional efficiency of transformers, losses are classified as:

- A—No-load losses (core loss, I²R loss due to the exciting current and the dielectric losses in the insulation)
- B—Load losses (I²R losses, stray load losses due to eddy currents caused by fluxes varying with the load)

Measured efficiencies are very difficult to obtain accurately. Meters with an error less than one per

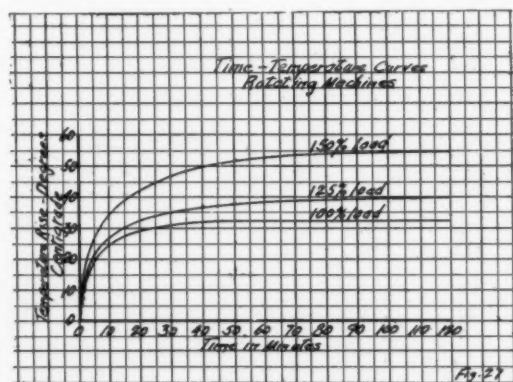


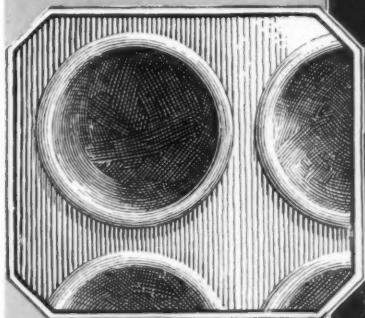
FIGURE 27

cent plus or minus are not commercial and are not obtainable except when special care is given to calibration. The conventional efficiency as calculated by the A.I.E.E. method gives a very accurate indication of the actual operating values.

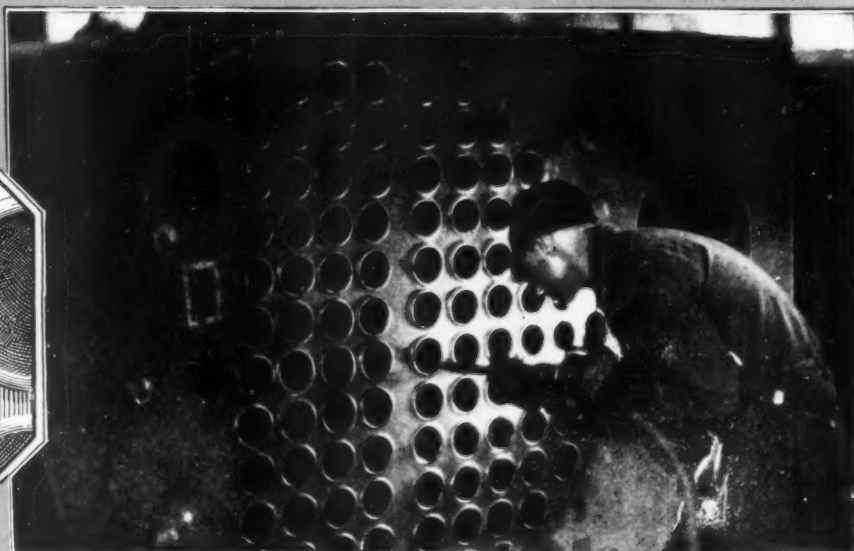
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BOOK NOTES

MAHOGANY—ANTIQUE AND MODERN

REALIZING that while we live in daily proximity to mahogany furniture in our homes, we seldom visualize the distant drama of human toil which produces the wood we see and touch so often in this or that familiar chair, table or bed, the editor of "Mahogany—Antique and Modern" has devoted the first chapter to a brief description of mahogany logging, believing, he writes, that an enlightening of this subject may even add interest to the furniture itself. The title of this chapter is "In the Forest," and in the description of the exploitation of the trees in Central and South America and Africa, there is made to appear almost as much of an adventure as that of big game hunting. Illustrations, interesting and educational, show the various stages of mahogany growing in the forest, dragging the logs out of the bush and sliding them into the water for rafting and transportation to cargo steamers.

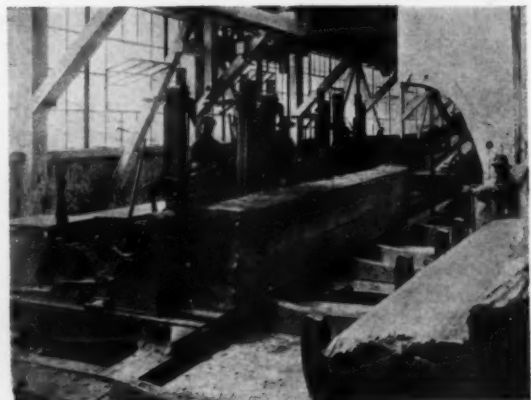
Part II has to do with "Mahogany and the Cabinetmaker." It is prefaced by an outline of the period of Chippendale, Sheraton and contemporaries, a period aptly called "The Age of Mahogany," for "in it there was discovered the one wood which in itself could express the rubicund hospitality of the Georgians." Appreciating that the master cabinetmaker today has to be familiar with different varieties of mahogany and with every phase of the wood's progress from the jungle to the workroom, this chapter deals comprehensively with the cutting of the logs in the mill, the removing of the flitch—that part which has a beautiful figure, and if large enough is reserved to be made into veneers—and the cutting of that portion of the log not used for flitches into boards for purposes requiring solid wood. There follows a detailed description of the making of veneers, in which beautiful photo-

graphs of various "cuts" are reproduced as illustrations—the swirl crotch, the broken stripe, fiddleback and mottle—and proper methods of seasoning, staining and polishing.

The third chapter is a treatise on Mahogany as used in Architecture, in which it is set forth that the great mahogany double doors, three inches thick, in Sir Robert Walpole's house, Houghton, built in 1722, represented the first use of this wood in architecture in England. During the late seventeenth and early eighteenth centuries, mahogany was generally used for stairways as well as doors, and for the larger and more important pieces of furniture, as great bookcases, and secretaries, which by reason of their size "were as much a part of the interior architecture as the panelled work." In 1760, when Robert Adam returned with his enthusiasm for the newly discovered late Roman remains at Herculaneum and Pompeii, the use of mahogany took on new forms, and the customary use for door leaves and stairways was carried to considerable elaboration. In France, mahogany was used little, other than for furniture, until about 1790, when, "with the changes consequent to the downfall of the Monarchy, which caused a tremendous upheaval in economic and social affairs, with their equally marked changes in taste, mahogany came into its own." Under the Directory and the Empire mahogany was treated with even less restraint than in England. Besides for doors and stairways, mahogany was used for cornices, pilasters, columns and wainscot, moulded and carved. "The restrained taste of the Colonial and early Federal builders led them to use the wood sparingly." It was generally used by them for stairways, doors and panelling, and certain beautiful old stairways in this country are cited, namely, that



LOGS RAFTED READY FOR TRANSPORTATION TO STEAMERS, FRENCH WEST AFRICA
(From *Mahogany—Antique and Modern*)



AFRICAN MAHOGANY LOG BEING CUT LENGTHWISE BY THE BANDSAW
(From *Mahogany—Antique and Modern*)



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in Independence Hall, another at Westover and still another at Shirley on the James River in Virginia. In old sections of New York, in Washington Square and Greenwich and Chelsea, we may find mahogany doors of a departed day. Regarding its modern use, whole rooms panelled in mahogany can scarce-



TYPICAL ACCUMULATION OF FRESH-CUT MAHOGANY LOGS AT RIO SAN JUAN, NICARAGUA
(From *Mahogany—Antique and Modern*)

ly be successful, says the author. The effect is too rich and luxurious. Its use is rather limited to places where its color accents are desired, as in mantelpieces, or doorways with carved doorheads and bookcases.

There then follows a chapter on the "Use of Mahogany in Marine Architecture and Boat Building" and one on the "Piano and Its Prototype," illustrating interesting portable pianos of 1880, a barrel organ and other early American instruments. In a chapter entitled "Historic Furniture Styles," the use of mahogany by the masters of the eighteenth century in England and France is traced, and under a heading, "The American Inheritance," its use by the craftsmen of early American and Colonial times is described, who, the author writes, "built and furnished their houses after the fashion of those which they had left behind them."

In the final chapter, dealing with furniture of the present day, the author points out that the high standards of architecture in America and the largely increased interest of the public in the work of architects have extended to those contributory arts which complement and complete the art of building, of which furniture making is perhaps among the most important. Its history runs parallel to that of architecture. "If the moral to be derived from the renaissance of good architecture in America is applicable to furniture making, the logical and economical place for this renaissance to begin is in the great factories. Such a renaissance in the realm of cabinetwork may take two general lines: It may follow the method which reproduces more or less exactly, adapting with slight change, the forms of the great furniture of the past. Then, too, side by side with this, is the realm of free modern design, based upon the essential and fundamental

rules of tradition, but branching out into a new spirit which may be that of modern times." Finely trained designers are necessary for both types, he claims. "For the first, a conventionally trained designer, with knowledge and taste, is required. He need not be an artist of great ability but a conscientious student and preferably well trained in cabinetmaking. For the second type a designer is predicated who is both the artist and the craftsman. His artistic sense must respond as does that of the architect, the sculptor and the cabinetmaker combined. He must have a thorough knowledge of traditional design, in addition to the creative urge which leads to purely original work."



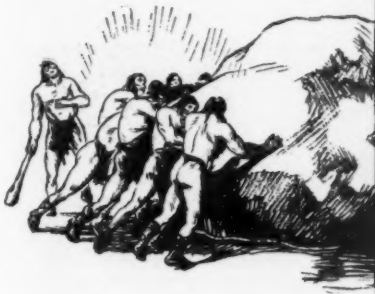
MAHOGANY ATTAINS ITS MOST MARVELLOUS FIGURE TYPE IN THE FLAME OF "CROTCH" OR "CURL"
(From *Mahogany—Antique and Modern*)

These chapters are followed by two appendices dealing with the technical phases of mahogany, and an index. This book is edited by William Farquhar Payson, other contributors being Charles Over Cornelius, Henry B. Culver, Ralph Erskine, Frances Morris, Kenneth M. Murchison, A.I.A., Meyric R. Rogers and Karl Schmieg.

Mahogany—Antique and Modern. Edited by William Farquhar Payson. One hundred and fifty pages of text, two hundred and fifty pages of half-tone plates. Size, 9 x 13. Board cover. Price, \$15.00. New York. E. P. Dutton & Co.

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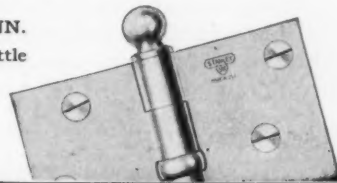
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THE ENGLISH INN, PAST AND PRESENT

AS a background for fiction, the English inn has for many years been a favored location. Both Dickens and Thackeray realized the possibilities of such settings and whatever knowledge is had of English inns by the reader in this country has been largely influenced by the works of these authors.

That the English inn was picturesque we know, and we further have the knowledge that it retained in the greatest degree the true atmosphere of English domestic life. The tap rooms and kitchens of these romantic old structures were democratic meeting places of the travelling public. All grades of society found a common level about the table in an English inn, and the titled traveller was as apt to choose a warm and comfortable seat in the angle of the kitchen fireplace as the "private room" of those who aimed at strict seclusion. English innkeepers, male and female, were national types and have been placed before us in the most interesting way by Victorian writers of English fiction.

Many books on English inns have been written, but none have more thoroughly covered this type of building than Richardson and Eberlein, whose *The English Inn, Past and Present*, is but recently issued. From this excellent work we are enabled to secure an accurate knowledge of the architecture of these romantic old structures, some of which, under newly given names, have figured largely in the literature of English domestic life. This book is useful to architects as its illustrations present good suggestive material. Such fine old inns as the Star at Alfriston and the Barley Mow at Clifton Hampden are the sort that come nearest to the romantic idea of the English inn. They suggest all the "good entertainment for man and beast" for which the inn was famous, and the style of their architecture, closely following that of the roadside English cottage, conserves all the best elements of domesticity.

Any man who has toured in England will recognize among the many illustrations some familiar tavern and live again in memory of a most delightful visit. To the man less fortunate, this book will truthfully acquaint him with these charming landmarks and urge him toward a better acquaintance.

Architects who appreciate a book such as this will be undecided whether to place it in their home library or, by reason of its fine suggestive value, on the shelves of their office and working library. The solution of this problem will lie in the purchase of two copies.

The English Inn, Past and Present. A Review of Its History and Social Life. By Harold Donaldson Eberlein and A. E. Richardson. Full cloth; 300 pages; size 7x10, with many illustrations. Price \$7.50. Philadelphia and London, J. B. Lippincott Co.

HOW TO STUDY ARCHITECTURE

ANY guide to a closer knowledge of architecture from its earliest and primitive forms to its present complex presentation, would, as a rule, be more accurately and appreciatively successful when done by a man who has been trained in the practice of the profession. Yet, it is a curious contradiction as to teaching to find that the most successful teachers are often those who have no practical knowledge of their subject, but have so thoroughly read up on their topic as to be able to get its basic truth home to a pupil in the very best and most satisfactory way. The most successful teacher of the piano is often not even an average performer, while vocal teachers with no "voice" of their own have been successful in developing that of their pupils.

We are moved to these remarks after reading *How to Study Architecture*, by Charles Henry Caffin, who for a number of years has been among the best of writers on art topics. While the book is more largely aimed directly at the layman, it is a safe one to place in the hands of the architectural student. Its aim, as set forth by the author, is "an attempt to trace the evolution of architecture as the product and expression of successive phases of civilization. Regarded from that angle, the author makes his point. His deductions, based on the general or exterior aspect of his subject, may be accepted as in the main correct. He tells the professional architect nothing he does not already know. The value of the book lies in its honesty of purpose, and that it contributes to the propaganda of better knowledge of architecture on the part of the masses.

How to Study Architecture. By Charles H. Caffin. Full cloth; 500 pages; size 5½x8½ inches, with illustrations. Price \$4.00. New York, Dodd, Mead & Co.

ATLANTIC TERRA COTTA

NUMBERS 6 and 7 of *Atlantic Terra Cotta*, the house organ of the Atlantic Terra Cotta Company, have been received, and as usual they are admirable monographs. Number 6 treats of terra cotta as relating to Romanesque designs. Number 7 treats of certain types of architecture in the period covered by the years 1879-1881. As we have before stated in these columns, these monographs have a very large suggestive value to designers. They may be had free on application to the Atlantic Terra Cotta Company at any of their several offices, or, more particularly, at 19 West Forty-fourth Street, New York City.

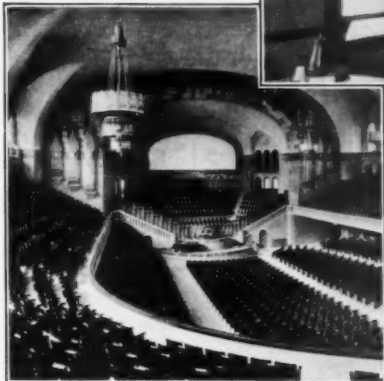
NIAGARA FRONTIER PLANNING BOARD

THE first annual report of the Niagara Frontier Planning Board to the New York State Bureau of

Moody Bible Institute Auditorium, Chicago. Fugard & Knapp, Ltd., architects. Acousti-Celotex used for acoustical correction and interior finish.



Press room, Milwaukee Journal, Milwaukee, Wisconsin. Frank D. Chase, Inc., architects. Acousti-Celotex used on ceiling to quiet noise.



Office of Mr. Marquette Healy, President Lyon & Healy, Chicago. Acousti-Celotex used for sound quieting and interior finish. Note the beautiful decorative effect secured on the ceiling.



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Housing and Regional Planning has been received. This report, taken in connection with the ample report of the City of Buffalo, treated in full in a recent issue of this journal, presents a comprehensive idea of the project that is now being carried forward to provide a plan of extension for the Niagara Frontier, which includes Niagara and Erie Counties, that will insure the best development of this section that could be possibly attained. Copies of this report may be had on application to the New York State Bureau of Housing and Regional Planning, Albany, N. Y.

PENNSYLVANIA STATE BOARD OF EXAMINERS IN ARCHITECTURE

THE State Board of Examiners of Architects in Pennsylvania announces that the next written examination will be held at the University of Pennsylvania, Philadelphia, and also at Carnegie Institute of Technology, Pittsburgh, June 22 to 25, inclusive. Those eligible for this examination should file their papers with the secretary, M. I. Kast, State Board of Examiners of Architects, Harrisburg, Pa., not later than June 10. The State Board urges the young men of the profession to secure their registration by examination, as it creates a basis for reciprocal transfer.

UNIVERSITY OF MICHIGAN TRAVELING FELLOWSHIP

LEROY E. KIEFER of Detroit, Mich., has been declared the winner of the George G. Booth Traveling Fellowship in Architecture for the year 1926-1927. William A. Turnbull and Livingstone H. Elder divide the honors of second place. The income of the Fellowship is \$1,200.

INVESTIGATE BEFORE GIVING

THIS is an age of solicitation. There are "drives" and appeals for contributions to help all sorts of charities to promote impractical things. The Charity Organization Society of New York has prepared a circular for distribution among the members of the Fifth Avenue Association, to serve as warning to beware of the "special pleader" who seeks support for some purpose in which the organizers will more generally derive the largest benefit. The circular reads as follows:

"My wife talks and talks and talks; I just got to have a divorce, judge." "What does she talk about?" inquired the sympathetic judge. "I don't know, your honor, she doesn't say."

Some of the people who start up social agencies are very much like the heroine of this story. They can orate by the hour about their plans for saving the world, but when it comes to explaining just what they are doing, and how and where, they simply fail to register. Their programs, like Hamlet's book, seem to consist of words, and words, and

then more words. It is apparently the easiest thing in the world to pick out some slogan, like 100% Americanism, which is general enough to mean almost anything, and then build up an appeal on it. But talk is notoriously cheap and slogans are worth very little unless backed by a concrete program. Nevertheless, they impress some people so much that they plunge in with a contribution, not stopping to find out what the "cause" really is, if anything.

Any organization which appeals to the public for support should offer the public something more than glittering generalities. It should be able to tell how its stated purpose is being carried out, what activities are involved and how they are managed, also the number of people reached by its service.

MODERN TOWN PLANNING IN PALESTINE

THE progress of the Jewish re-settlement of Palestine is well illustrated by the application of the most up-to-date methods of town planning, states *The Builder* of London. Richard Kaufmann, town planning expert, was in England recently to confer with Professor Abercrombie and other authorities here, and while in London gave a brief account of his work.

Mr. Kaufmann said that the rapidity with which new Jewish settlements were being created, both in urban and agricultural districts of Palestine, made the question of town planning a matter of urgent necessity, both from the æsthetic and economic points of view. The hilly nature of the country made the work technically of some difficulty, but considerable success had been achieved in adapting the layout of roads and avenues to local contours. He illustrated this by examples of new suburbs constructed in the environs of Jerusalem and Haifa, where advantage was taken of every feature of the surroundings to combine beauty with utility.

Palestine is the first country in the world where the principles of town planning have been successfully applied to agricultural settlements. Mr. Kaufmann showed two examples of his work in this direction. The co-operative farm colony of Nahalal in the valley of Jezreel is situated on an oval hill, the summit of which has been used for the communal buildings which dominate the settlement. The hill is encircled by a road, from which the approach roads lead off. In the center space of the circle are placed the houses and gardens of the non-farming members of the colony, the schoolmaster, tailor, shoemaker. In the outer circle are the homesteads and holdings of the farming families, all equidistant from the communal and utility buildings. The cereal lands radiate out on the flatter areas at the foot of the hill.

A different arrangement has been adopted in the case of the other settlement, known as Chittim, a colony of orthodox Jews, on a similar hill near the lake of Tiberias. Here, for religious and æsthetic



Entrance Detail, Bankers Trust Co., Detroit, Mich., Smith, Hinchman & Grylls, Architects. Faced entirely with Terra Cotta (column shafts marble).

A DEPARTURE

THE austere formality of classic design has been the dominant note in bank architecture for many decades.

The implications of this style have run well with popular conceptions of the cold disposition of financial interests and unapproachable attitude of banking executives.

The contrary policy prevailing in progressive banking circles today calls for less coldly formal design to properly interpret the bank's public relation.

"Terra Cotta of the Italian Renaissance" published by this Society (\$3. per copy) contains many engaging motifs well adapted to this purpose.

NATIONAL TERRA COTTA SOCIETY

19 West 44th Street

New York, N. Y.

reasons, the synagogue and people's hall are placed at one end of the hill overlooking the lake, while the utility buildings (such as the granary) are again placed in the center. Careful planning has been applied to the courtyard of each farm, regard having been paid to the prevailing winds.

PARIS STREET TREES STRUCK BY BLIGHT

PARIS has almost as many difficulties as Central Park, New York, with its trees. And Paris, whose pride has been the trees that line her principal streets, is seriously perturbed by the fact that no sooner do the trees burst into leaf than the leaves begin to fall.

By the middle of August the town is Autumn-clad. By the end of August the trees are as bare as in the Winter. Nor is that the worst of it, for the rate of mortality among them is very high. Some of them hardly last out a few years; many die as saplings the same year they are planted—which is expensive for the Town Council and hence for the taxpayer.

Recent investigation places the blame upon poisonous motor exhaust gas. Leakage of illuminating gas and electricity has been blamed also. Now another cause for the blight has been assigned. This is that the dust from the modern wood paving of the streets contains infinitesimal wood particles which attack first the leaves and then the trees themselves, and eventually kill them.

It has been noticed that chestnuts are more subject than any other trees to this new poison—whatever it is—and that acacias put up the best resistance.

PERSONALS

Ben J. Lubschez, architect, has moved his office to 729 Seventh Avenue, New York City.

Edward J. Weber, architect, has moved his office from 237 Fourth Avenue to Suite 712, 230 Fifth Avenue, Pittsburgh, Pa.

Arthur C. Holden & Associates, architects, announce the removal of their offices to 232 Madison Avenue, New York City.

Howell & Thomas, architects, have moved their offices from 4400 Euclid Avenue to their new building at 3868 Carnegie Avenue, Cleveland, Ohio.

William F. Gunnison, architect, has moved his office from 57 Post Street to 1017 and 1018 Shreve Building, 210 Post Street, San Francisco, Calif.

Berlinger & Kaufman, architects and engineers, have moved their offices to 66 Fifth Avenue, New York City.

Theodore Eichholz, architect, has moved his office from 413 Fourth Avenue to Suite 500, 230 Fifth Avenue, Pittsburgh, Pa.

Russell Seymour, architect, is now occupying offices at 205 Hamby Building, Jacksonville, Fla., having moved from Charleston, W. Va.

R. F. Hennig, architect, has recently opened an office for the practice of architecture at 834 Brandeis Theatre Building, Omaha, Neb.

Lynch Luquer, architect, has moved his office from 819 Fifteenth Street to the Hill Building, Seventeenth and Eye Streets, Washington, D. C.

Eugene G. Groves, architect, announces the removal of his offices from 222-223 Foster Building to 1982 Broadway, Denver, Colo.

Clarence A. Koenig, architect, has moved his office from the Edmund Building to 2036 Russell Boulevard, St. Louis, Mo.

Leonard S. Henry, architect, is now located at 155 East Forty-second Street, New York City, having moved from 347 Madison Avenue.

Edward Schoeppe, architect, has moved from 316 South Fifteenth Street to 1437 Spruce Street, Philadelphia, Pa.

Russell L. McKown has opened an office for the professional practice of landscape architecture and town planning at 910 Kahl Building, Davenport, Iowa.

DePace & Juster, architects, have moved their offices from 110 West Fortieth Street to 6 East Forty-sixth Street, New York City. Manufacturers' samples are requested.

Eugene Henry Klaber and Ernest A. Grunsfeld, Jr., architects, have moved their offices from 81 East Madison Street to the Tribune Tower, Tribune Square, Chicago, Ill.

Mortimer E. Freehof, architect, announces the removal of his offices to 415 Lexington Avenue, New York City, where he will continue in the practice of architecture.

Fred Fornoff, architect, has opened an office for the general practice of architecture at 88 North Front Street, Columbus, Ohio, where he would be pleased to receive manufacturers' catalogs and samples.

THE PUBLISHERS' PAGE

THE Bureau of Architecture of the Methodist Episcopal Church writes to us over the signature of their director, Elbert M. Conover, as follows: "We are greatly interested in your editorial on The Publishers' Page, issue of May 20. In our work we have felt very intensely the need for education as to the value of architectural service. We presume that the churches have suffered more than any other class of building on account of poor architectural service."

Accompanying this communication is a circular issued by this Bureau, "The Employment of an Architect—A Serious Matter." The circular, which is given the widest possible distribution amongst church boards and others charged with building matters, states that

"Certain calamitous results, on account of inefficient architectural services recently observed, have stimulated this communication," and then proceeds to set forth logically the results that the Bureau has observed in large operations of church building all over the United States. The circular states in part:

"Poor architectural service results in a waste of space and material, and ugly, inadequate and unsafe buildings.

The architectural profession is one of the learned professions in which the members, if competent, must have the technical skill and knowledge required by their work, business and executive ability, and to all this the addition of artistic feeling with a background of general scholarship. The trained architect has taken courses in liberal arts, literature, and history as well as technical training in design, architecture, and engineering.

The "plan drawer" in states that have lax laws regarding registration of architects may be merely a draftsman or builder who can represent in a bare way the elements of construction, leaving all important details to be filled in as may suit the whim of anyone into whose hands the "plans" may fall.

In many states the law governing the practice of architecture is very explicit, fixing definite responsibilities upon the architect. In states requiring the registration of architects after having passed a state examination, it is illegal to use the term "architect" without such legal registration.

The American Institute of Architects, with headquarters in Washington, D. C., is the national

professional organization. To become a member one must be a legally qualified architect and must meet certain ethical and professional standards.

The architect is a referee. During the planning and construction of the building, questions constantly arise as to material to be used, the composition of mixtures, etc. The architect is the one to whom all such questions are referred. He is responsible for seeing that the builder meets every requirement implied in the blueprints and specifications. In certain cases the construction company prepared the plans or employed some one to do this. Every question was passed upon by a man known as the architect, but actually in the employ of the construction company.

This, of course, to the advantage of the construction company. The owner is left without an advocate and sometimes must go to the expense of employing additional architectural service for his own protection. Needless to say, this is contrary to the ethical code of The American Institute of Architects.

The division of architectural service and compensation is on the basis of 6% of the cost of the building.

A real estate agent charges 5% on the selling price for service involved in selling a property. It would seem that the very responsible ser-

vice of a competent architect must cost at least 6% of the cost of the building. To pay less often involves risk.

We recently saw the wall of a \$300,000 new church building of another denomination lying in ruins because it had not been designed with sufficient strength to carry the weight of the roof. These architects were deficient in engineering and did not employ competent engineers. They sold their services to these churches, however.

An architect should be employed on the basis of his ability to solve a building problem and not on his ability to sell his services or to make a pleasing impression upon the building committee. Do not be surprised if the most capable architects do not solicit work.

To recommend an architect involves considerable responsibility. Unfortunately for the cause of church building several architects who have been successful as clever salesmen have come short of giving the church the service required and desirable."



E DUCATING the public in the choice of an architect is a serious matter. Learning by practical experience the dangers that lurk in unskilled architectural service, the Methodist Episcopal Church has a well organized bureau that works to overcome this evil. This organization's influence is nation-wide in its field. An instance of its valuable and well directed effort is set forth on this page. It is the most direct and forceful propaganda that may be successfully employed to accomplish a desired purpose.



HOWARD VAN DOREN SHAW, F.A.I.A.

1869-1926

(From the bust by Sylvia Shaw Judson, Sculptor)